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Contributions to the Laboratory Diagnosis of Amoebiasis
FROM THE
Chicago Outbreak of 1933

By FRED O. TONNEY, MARIAN MCILHENNY
GERALD L. HOEFT *and* C. H. KOONZ
Section of Technical Service and Research
Board of Health, Chicago

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By R. ST. J. MACDONALD *and* GRACE M. FREEBORN

At the request of a number of sanitary inspectors, mimeographed reprints of this article, which was published in the February 1933 issue of the JOURNAL, have been prepared for distribution. Copies are available at ten cents each.

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A Hospital Epidemic of Paratyphoid A*

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THE outbreak of enteric fever here described occurred in a general hospital in the city of Montreal in the Province of Quebec last August. This epidemic, as far as we were able to ascertain, was confined to the personnel and bed patients of the hospital. In all, 17 clinical cases of enteric fever consisting of paratyphoid A, paratyphoid B, and typhoid infections were found. There were no deaths.

CONDUCT OF THE INVESTIGATION

On the 12th of August, 1935, the local health department reported to Dr. L. A. Chabot, Provincial Health Inspector for Montreal District no. 1, that some cases of typhoid existed in a general hospital in Montreal. Dr. Chabot immediately informed the District Inspector of Health, Dr. J. L. Faille, and the following day the latter visited the hospital and commenced his investigation. He visited those of the staff and patients who displayed symptoms of enteric disease and collected data, recording these on the epidemiological cards that are used by the Provincial Bureau of Health. He obtained specimens of faeces and blood on these cases and sent them to the Provincial Laboratories for diagnosis. A few days later the laboratory findings indicated that he was dealing with a mixed infection of *Salmonella paratyphi A, Salmonella paratyphi B,* and *Salmonella typhi.* Later, the co-authors joined in the investigation.

**Presented before the Section of Vital Statistics and Epidemiology at the Twenty-fifth Annual Meeting of the Canadian Public Health Association, Vancouver, B.C., June, 1936.*

The hospital was repeatedly visited and the charts of all patients presenting symptoms of enteric infection were examined. The charts were also searched for patients with unexplained fevers. All patients with such symptoms were questioned and examined. A complete list was made of everyone in the employ of the hospital and data obtained as to age, sex, occupation, history of typhoid vaccination or typhoid fever. It was also noted whether they were on the sick list. If they were sick, an epidemiological card was completed for each person, giving full details of the onset and nature of the illness, the person's activities, visits and possibilities of contact for the three weeks preceding the onset. Such cards showed also the usual information concerning the food consumed, including water and milk. It was quite apparent by this time that this was a hospital epidemic and in order to catch any "missed" cases or a carrier if one existed in the hospital, specimens of blood, faeces, and urine were requested from each of the personnel and from each bed patient. The specimens were all sent to the Provincial Laboratories. A survey of the handling and preparation of the food in the institution was made, and later of the sanitation, with particular reference to the plumbing and drainage.

FINDINGS OF THE INVESTIGATION

The hospital concerned is a five-storey, modern hospital building situated in a residential area. It has a capacity of 225 beds, both public and private, and receives all cases of illness excepting acute communicable diseases. The total personnel at the time of inquiry was 132. Bed-patients had been admitted and discharged during the epidemic so that it was difficult to determine just how many bed-patients had been exposed during the hospital outbreak. At the time of our visit, approximately one-half of the beds were occupied. On Dr. Faille's first visit on August 13th, he was informed that during the preceding five weeks nine of the staff had been ill with what appeared to be a similar generalized infection. In addition to these nine cases, eight more were found during this investigation, making a total of 17 cases.

Clinical Observations

The disease was characterized by its insidious onset with lassitude, headache, anorexia and malaise and a few flushes. It was difficult for the patients to set a date of onset because of this insidious character of the invasion.

The fever was hectic with a rise to 100-102°F. in the afternoon and a fall at night. None of the *S. paratyphi A* infected patients had a higher temperature or a plateau type of temperature. The low grade fever lasted for several weeks, the chart changing little from week to week. None of the cases suffered from diarrhoea but were mostly slightly constipated. The spleen was palpable only in the case who was suffering from typhoid also (D.L., no. 4). Typical rose spots were seen on this patient during the third week of her disease. None of the other paratyphoid A cases exhibited a skin eruption. In three proved paratyphoid A cases, blood counts in the second week of illness showed 6,000 to 8,000 leucocytes per cmm.

Epidemiological Data

Table I presents some of the epidemiological data on the cases. Column 3 shows that of the 17 cases 6 were male and 11 female. Their ages varied from 11 to 55 years with 8 cases in the 20-25 year age-group. The cases are numbered and arranged, as will be seen in the next column, by "date of onset". Under "history of vaccination", it is seen that 3 cases gave such a history. Whether it was typhoid or typhoid-paratyphoid vaccine they received is not definitely known. The organism was not obtained from specimens of any of these previously-vaccinated persons so they are not definitely proved cases. One

TABLE I

Epidemiological Table of Persons Ill

No.	Name	Sex M	Sex F	Age	Date of Onset	Hist. of Vacc.	Status in Hospital	Admitted to Hosp. Bed	Serum Agglutination Flex.	Serum Agglutination Typh.	Serum Agglutination A	Serum Agglutination B	Organism recovered from faeces
1	M.G.		+	45	July 1	No	Patient	May 16			+		A
2	Dr. L.A.V.	+		24	" 7	"	Interne						
3	D.C.	+		30	" 20	1927	Physician	July 25	+	+	+	+	
4	D.L.		+	21	" 23	No	Nurse	" 25	+	+			AT
5	Mrs.E.F.		+	35	" 25	"	Patient	June 27			+		A
6	L.C.		+	25	" 30	1929	Nurse	Aug. 12			+		
7	Dr.N.B.	+		25	Aug. 2	No	Interne	" 2			+	+	
8	D.B.		+	24	" 3	"	Nurse	" 12					A·
9	R.B.	+		11	" 3	"	Patient	July 4-15 Aug. 6			+		B*
10	E. Van B.		+	20	" 3	"	Nurse	Aug. 13	+				A
11	Mrs. P.E.		+	34	" 6	"	Patient	July 16					
12	D.M.		+	22	" 6	"	"	J'y 11-20 Aug. 12			+		A
13	Dr.R.G.	+		33	" 6	1927	Lab. worker						
14	Mrs. S.S.		+	34	" 7	No	Patient	July 22	+				
15	Mrs. C.M.		+	55	" 8	"	"	May 1			+		A
16	L.M.	+		14	" 8	"	"	J'y 10-26		+	+		
17	A.Y.		+	21	" 12	"	Nurse	Aug. 16					A

*S. *typhi* isolated from blood.

person only (no. 6, L.C.) gave a history of typhoid fever, in 1932. The heading of the column "admitted to hospital bed" indicates when the case entered hospital as a patient. Thus case no. 1, M.G., a bed-patient, came into hospital on May 16th with another complaint and the onset of this illness was July 1st. It is seen that case no. 9 (R.B.) was admitted twice; the second time, August 6th, he entered hospital suffering from the present illness. Similarly, case no. 12 (D.M.) was admitted twice. The table gives the positive laboratory findings on these cases.

The epidemic, it is seen, lasted from July 1st until August 12th. Odd cases occurred irregularly during July, and during the first eight days of August a total of 10 new cases appeared.

Case no. 1, M.G., had been in the hospital since May 16th, having been admitted with a history of abdominal pain and vomiting. Her daily temperature chart showed that the beginning of her "febrile" illness was on July 1st. During

the 6 weeks preceding this onset, she had been on the second floor in a three-bed ward (205, fig. I). She had apparently contracted the illness in this ward. Her illness was not diagnosed until August 13th when *S. paratyphi A* was isolated from a faecal specimen. That is, she had been ill with paratyphoid A fever for 44 days before the diagnosis was made. During this time she was, when feeling better, ambulatory, going to the common toilet in the right wing of the second floor and visiting patients in neighbouring beds and wards. It is possible that she infected cases nos. 5, 11, 12, 14 and 15 in the same ward by direct contact. Case no. 2 was a medical student who had left the hospital after

TABLE II

DISTRIBUTION OF CASES BY OCCUPATION

Occupation	Total No.	Number ill with this disease
General help	59	0
Nurses	42	5
Physicians	16	3
Patients	?	8
Lab. workers	4	1
X-ray	2	0
Administration	6	0
Pharmacist	1	0
Social service worker	1	0
Dentist	1	0
Total	132+	17

being ill and was never a proved case. He had been working in all the wards of the hospital. Case no. 3 was a physician who treated case no. 1 and whose onset, as near as could be determined, was July 20th. Another physician who contracted the disease was no. 7, Dr. N. B., who took ill on August 2nd and who also had worked in the medical wards on the second floor where case no. 1 was a patient. Case no. 13, R.G., was the director of the hospital laboratory. As far as could be ascertained, he did not do work in the wards but spent all his time in the laboratory on the fifth floor.

Table II shows the distribution of the exposed group and cases by occupation. General help included kitchen staff, wardmaids, orderlies, and firemen. It is seen that the cases of enteric fever were confined to patients in bed in the wards, to nurses, physicians, and one laboratory worker. There were no clinical cases among the general help.

Nurses

There were 5 nurses known to have contracted the disease, nos. 4, 6, 8, 10 and 17. The dates of onset of their illnesses were between July 23rd and August 12th. In determining where they had been on nursing duty for three weeks prior to the onset of their disease, it was found that two, i.e., no. 8 and no. 17, had nursed on the second floor, right wing. One had nursed on the fourth floor and one (no. 4) in the operating room. The fifth, L.C. (no. 6), had had no contact with the known paratyphoid patients but had been working in an affiliated hospital.

Figure I shows that six of the eight hospital patients involved had contracted their disease in the wards of the second floor, right wing, where the first case occurred. The remaining two bed-patients involved in this outbreak were cases no. 9 (R.B.) and no. 16 (L.M.).

Case no. 9 (R.B.) who had a typhoid-paratyphoid B infection was more seriously ill than the paratyphoid A patients. He had been a patient in the hospital between July 4th and 15th, having had a tonsillectomy performed, and during this time had been in a room on the fifth floor on the opposite side of the hospital from the cases on the second floor. He was not nursed by any of the subsequently diagnosed paratyphoid cases. Case no. 16 (L.M.) was a 14-year-old boy who had been in the hospital from July 10th to 26th for a herni-

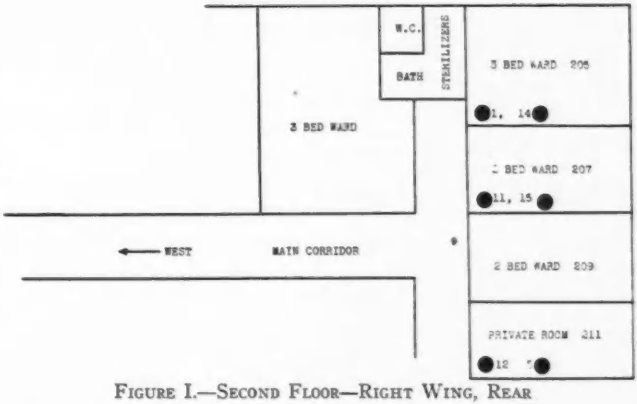

FIGURE I.—SECOND FLOOR—RIGHT WING, REAR

otomy. The bed he occupied was on the fifth floor. He had his onset after returning home on August 8th and was diagnosed by the family physician who attended him at home. The city laboratory had made the diagnosis on a specimen of blood submitted. The case was reported to the health officer by the city laboratory. These two boys were probably infected on the fifth floor.

Where might the physicians and nurses have been infected? The ill nurses had their quarters on the second floor in the left wing. The internes, three of whom were on the sick list, had quarters on the fifth floor, left wing. One interne, no. 3 (D.C.), did not sleep in the hospital. The other two internes who were involved slept in adjacent rooms.

The nurses and wardmaids took their meals in their dining room in the basement, as shown in figure II. The doctors' dining room was on the same floor. Here the three physicians and the director of the laboratory, who were infected, had taken their meals.

The food for the whole hospital, including patients, and doctors', nurses' and maids' dining rooms, was prepared in the general kitchen in the basement and distributed from there.

Of the 20 or more persons who had meals in the doctors' dining room, 4 had been ill. Of the 42 nurses who had meals in the maids' dining room, 5 had

been ill, but none of the 16 wardmaids and 43 other general help who had meals in the latter room had reported ill.

Of the 17 cases discovered, the laboratory findings revealed that two of them suffered a double infection; i.e., no. 4 (D.L.), a nurse, had her onset on July 23rd, and had been infected with both typhoid and paratyphoid A, and case no. 9 (R.B.) was, it appears, infected with *S. paratyphi A* but had also a typhoid septicaemia and in addition *S. paratyphi B* was isolated from stool specimens. One other non-vaccinated case, no. 16 (L.M.), had typhoid agglutinins in his serum. Case no. 7 (Dr. N.B.), who stated he was not vaccinated, had *S. paratyphi B* agglutinins as well as A in his blood serum. In view of these findings of mixed infections which suggest sewage contamination, an

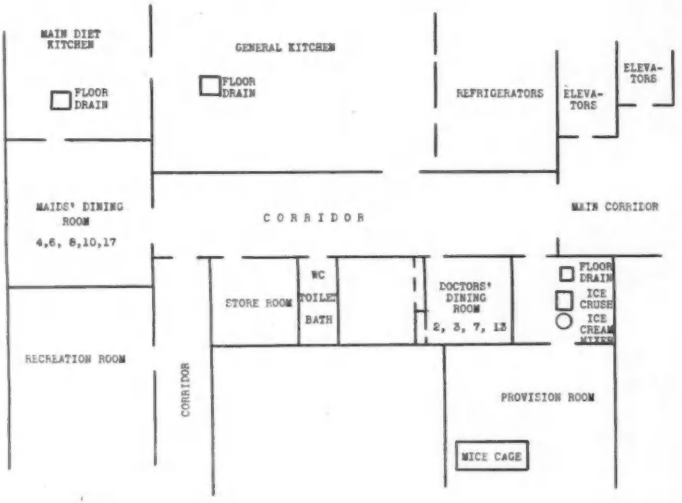

FIGURE II.—BASEMENT FLOOR

examination of the plumbing and drainage of the hospital was made by Mr. Theo. J. Lafrenière, C.E., Provincial Sanitary Engineer.

Inspection of Plumbing and Drainage

The sewerage system of the hospital is a closed system with one outlet to the street sewer. In the basement was a concrete floor with open floor drains in the main diet kitchen, the general kitchen, and in a small room used for crushing ice. (See figure II of the basement floor.)

The kitchen staff and the engineer who was, at the time of investigation, operating the ice-crushing machine, stated that at time of heavy rains the floor drains back-flowed, flooding the kitchen floors with sewage, and that putrid odours arose from these drains. According to the evidence of several persons, this had happened on two occasions in July. On inquiring as to the chance of food being contaminated on this sewage flooded floor, the routine working of

the ice-crusher was enlightening. It was customary to crush the ice for consumption and then to dump it on the concrete floor over the floor drain where it remained and as it melted the water was carried off by the floor drain. Any attendants or kitchen help needing crushed ice came down with their vessels and scooped this ice off the floor. The hospital bacteriologist, with aseptic precautions, collected crushed ice from the floor and also washings from this part of the floor and she herself isolated *S. paratyphi A* from the ice. From both the floor washings and ice submitted to the Provincial Laboratories, cultures of *S. paratyphi A* were isolated.

This was then a possible agent for the transmission of the infection. The crushed ice was used freely in the doctors' dining room, especially in the hot July and August days. It was used throughout the hospital. There was no regulation requiring it to be washed for the ice was made from city water.

Sanitary Engineer's Report

It was a common occurrence that the basements of houses in the neighbourhood were flooded during heavy rains. This had occurred several times in July. The engineer learned that the hospital had some floods in the basement before 1931 prior to the installation of a check-valve in the sewer. Since that time, however, there had been no complaints although the valve had not been examined for over a year. It was possible that if the roof water during heavy rains were of sufficient volume to close the check-valve there could have been an overflow into the basement of the hospital, resulting from the use of sinks and toilets in the upper storeys. There had been floods of neighbouring houses during a heavy rain on July 23rd.

The meteorological reports for Montreal showed that on certain days, namely, July 15th, 23rd, 28th, and August 4th, there had been over one inch of rain. At these times the backflow of sewage into the basement might have occurred. Some of the patients may have been infected as a result of this and after an incubation period experienced the onset of their disease.

Laboratory Findings

The extent of the work efficiently completed by the Provincial Bureau of Health Laboratory is shown in tables III and IV. These represent a total of 139 blood sera, 198 faeces specimens, and 190 urine specimens examined.

Table III shows the laboratory findings on all persons who submitted specimens and positive findings for *S. paratyphi A*. It is seen that 163 persons were investigated and questioned and specimens requested. Of this number, 132 were personnel of the hospital and 31 were patients. Of this total 17 were reported ill with symptoms suggestive of Salmonella-like infections. One or more Widal tests (macroscopic sera agglutinations) were done on 127 persons, faeces of 121 were examined, and 119 had urine specimens examined. Altogether 37 persons showed sera agglutinins for *S. paratyphi A*. Twenty-five of these had been vaccinated. *S. paratyphi A* was isolated from the stools or urine of 10 persons. The only definite proof of infection of an individual is to isolate the organism.

Table IV shows all the positive laboratory findings on those submitting specimens. It is seen that from 10 individuals *S. paratyphi A* was isolated, from one *S. typhi* was found in the stool and from one in the blood. From one person *S. paratyphi B* was isolated from the faeces.

Table I shows the positive laboratory findings on those reported ill with this enteric infection. It is seen that from three patients, no. 4 (D.L.), no. 10 (E. Van B.), and no. 17 (A.Y.), the organism was isolated from stool specimens but their sera showed negative agglutination results to *S. paratyphi A.* In the case of no. 4 (D.L.) the serum was obtained on August 12th, 19 days after the onset of her illness. No other specimens from her were examined.

TABLE III
LABORATORY WORK DONE ON ALL INDIVIDUALS

Occupation	No. Investigated	Number of persons on whom							
		Were done			Para A +ve was found				
					Widal			Organism from	
		Widals	Faeces	Urine	Vacc.	Not Vacc.	Unknown	Faeces	Urine
General help	59	44	47	47	4	1	0	1	1
Nurses	42	38	41	40	17	1		4	
Physicians	16	12	4	4	2	1	1		
Patients	31	21	21	20		7	3	4	
Lab. workers	4	2	2	2	1				
X-ray	2	2	1	1					
Administration	6	5	5	5					
Pharmacist	1	1			1				
Social service	1	1							
Dentist	1	1							
Total	163	127	121	119	25	10	4	9	1

The other two had serum agglutinations done early in the second week of illness, possibly not early enough for the development of specific agglutinins.

Among those whose sera showed definite agglutination to *S. paratyphi A* and yet who gave no history of typhoid vaccination, typhoid fever, or illness during this epidemic were a nurse and two other persons. Similarly, another nurse had serum agglutinins to *S. paratyphi B* although she gave no history of vaccination or illness. Four unvaccinated members of the personnel, a nurse, two wardmaids and a cleaner, who were not ill and gave no typhoid history, had serum agglutinins to *Salmonella typhi* (*B. typhosus*). Three other wardmaids, whose vaccination and typhoid history is not available, showed similar findings for *S. typhi.* These serum findings are suggestive of a more widespread enteric infection among those exposed to the epidemic than would be suggested by the number that were clinically ill. A physician and two patients, none of them suffering from enteric symptoms, had positive serum agglutinins to *B. dysenteriae Flexner.*

B. alkalescens was found in faeces specimens of a diet kitchen worker and of a patient on the fifth floor. It was isolated also from urine specimens of three nurses and a wardmaid who were not ill. The presence of *B. alkalescens,* one of

the dysentery group, in the stools of many of the persons submitting specimens is important. This organism is frequently a concomitant of enteric disease caused by organisms of the Salmonella or dysentery group, and its presence, it has been found, indicates that further investigation of the possible presence of these pathogenic organisms should be made (1). The first specimens from I.C., the diet kitchen worker, yielded *B. alkalescens* and because of this, further specimens were requested. The subsequent examinations were rewarded by the finding of *S. paratyphi A.*

The number of persons showing agglutinins to *B. dysenteriae Flexner* is interesting and it indicates that this infection is probably quite widespread in the province.

TABLE IV

ALL POSITIVE LABORATORY FINDINGS

Occupation	Positive for *S. Paratyphi A*						Positive for *Salmonella typhi*						Positive for *S. Paratyphi B*					
	Widal Vaccinated			Organism in			Widal Vaccinated			Organism in			Widal Vaccinated			Organism in		
	Yes	No	?	Faeces	Urine	Blood	Yes	No	?	Faeces	Urine	Blood	Yes	No	?	Faeces	Urine	Blood
General help	4	1		1	1		6	4	2				5	1				
Nurses	17	1		4			17	1*		1			12					
Physicians	2	1	1				2		1				1	1	1			
Patients		7	3	4				2				1			1	1		
Lab. workers	1						1	1	2				1					
Pharmacist	1						1						1					
Total	25	10	4	9	1		27	8	5	1		1	20	2	2	1		

*History of typhoid.

Two other important findings were made by the laboratory.

(1) J.C., age 55, a male helper whose duty it was to handle the ice-crusher and the ice and garbage daily, was found to have agglutinins for *S. paratyphi A* and the organism *S. paratyphi A* was isolated from his urine. He had not been sick during July or August. He had been in Canada since 1913 and had worked in the hospital since 1927. He had come from Scotland. He had never had any affection resembling enteric fever and had not been vaccinated.

(2) I.C., a female age 21, had worked in the main diet kitchen since June 29, 1935. On September 5th, *S. paratyphi A* was isolated from her faeces. She came from her home in Halifax on June 29th. Beginning last January she was sick for three months with malaise, lassitude, and loss of weight. She stated that her illness was diagnosed as "anaemia."

Further Laboratory Investigation of the Paratyphoid Strains Isolated

S. paratyphi B was isolated from stools of case no. 9 (R.B.). This organism showed typical agglutination to titre in "O" agglutinating sera and a formolized well-flagellated culture agglutinated to titre in *S. paratyphi B* specific "H" absorbed sera. The *paratyphi A* strains isolated from the ice and patients were identical. Since this is the first time the organism has been reported found in

Canada, it may be well to present its characteristics. It was a flagellated Gram-negative bacillus. On dextrose, maltose, mannite, arabinose, dulcite, and rhamnose, acid and gas were produced. Lactose, xylose, inosite, raffinose, and lead acetate agar were unchanged. In "O" serum of Group A of the Kauffmann-White schema (2) the alcoholized "O" suspension agglutinated to titre. A formolized "H" suspension agglutinated with typical floccular agglutination to titre in a serum prepared against *S. paratyphi A Mears* (N.C.T.C. no. 2756). Reciprocal absorption experiments were carried out against *S. paratyphi A Mears* with complete cross-absorption of both sera.

MEASURES FOR CONTROL OF THE OUTBREAK

The immediate measures taken for controlling the outbreak were:

(1) Aseptic nursing, isolation, and disinfection of excreta of all those suffering from the enteric disease.

(2) Removal of carriers from the hospital and placing them under the supervision of the Division of Epidemiology.

(3) Correction of the faults in the general sanitation of the hospital.

Specific recommendations were made regarding universal vaccination with typhoid-paratyphoid A and B vaccine, bacteriological examination of future food handlers, and careful examination to establish carriers among those suffering from enteric fever before releasing them from isolation.

DISCUSSION

The facts show that 17 persons in the hospital concerned were definitely ill with what appeared to be an enteric fever. The epidemic began on July 1st and the last case had her onset on August 12th, e.g., 6 weeks later. Eight of these people were proved to be infected with *S. paratyphi A*. None of these eight had been vaccinated. Investigation showed that sewage had contaminated the ice supplied throughout the hospital and the ice and floor washings were found to be contaminated with *S. paratyphi A*. The first case (M.G.), who had been ill 44 days before being diagnosed, had been excreting untreated faeces into the closed sewerage system of the hospital all this time. One other possible source of *S. paratyphi A* reaching the sewage was the hospital laboratory, but we were assured that they had had no *S. paratyphi A* cultures in stock. The presence of cases infected with *S. typhi* and *S. paratyphi B* during the epidemic substantiates the theory of mixed infections due to sewage contamination. Two carriers of *S. paratyphi A* were found who were not on the sick list. At least three other persons who gave no history of vaccination showed agglutination to *S. paratyphi A* and it is probable that other patients in the hospital at the time of the epidemic were infected and were "missed" cases.

The first case diagnosed (M.G.) must have been infected in the hospital. It is probable that I.C., the carrier found in the diet kitchen, contaminated the food which M.G. consumed. She began work on June 29th. M.G.'s onset was July 1st—a possible incubation period of three days. M.G. in turn contaminated with untreated excreta the sewerage system of the hospital and thereby the sewage contaminated ice over the floor drain in the basement. Also, the concen-

tration of cases in wards 207-211 may be explained by direct contact infection as no isolation or aseptic nursing precautions were taken in this ward until August 14th. Those nurses, physicians, and patients who had no contact with the paratyphoid A patients on the second floor were using the contaminated ice freely and were probably infected by it. The male helper, J.C., who was found to be a carrier, was the ice handler and was probably infected from this source. On the other hand, he may have been a chronic carrier and contaminated the ice himself, and thus started the epidemic. This latter possibility, however, does not explain the presence of typhoid and paratyphoid B infections. If he was infected by the ice he suffered a subclinical infection for agglutinins in his blood serum showed that he had immunologically responded to the infection. When aseptic precautions were taken with the patients and consumption of the contaminated ice stopped, the epidemic immediately ceased. One question remains unanswered, namely, how and when did I.C., the carrier in the diet kitchen, become infected. She had been ill in Halifax from January to March with symptoms not unlike the prolonged mild disease which the patients in this epidemic suffered and she may have had paratyphoid A fever at that time. If so, she contracted the disease in Nova Scotia where paratyphoid A fever has never been reported. The other possibility is that she, like J.C., the ice handler, suffered a subclinical infection during the epidemic. It seems more likely, however, that she was the cause of this epidemic in view of the fact that she had been ill several months before.

CONCLUSIONS

This unusual epidemic was traced to a carrier in the diet kitchen of a hospital. The disease appeared to be transmitted to others by food contamination, direct contact, and through a faulty sewerage system to the supply of ice used in the drinking water throughout the institution. *S. paratyphi A* was actually isolated from the ice being distributed to the personnel and patients. The interest of this epidemic also lies in the variety of infections encountered. These included typhoid, paratyphoid A, paratyphoid B, and Flexner dysentery. These mixed infections frequently occur in outbreaks of enteric disease spread by water that has been contaminated by sewage.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the co-operation and assistance of Dr. L. A. Chabot, Mr. Theo. Lafrenière, and Mr. M. H. McCrady, Director of the Provincial Laboratories, and his staff, in the study of this most interesting epidemic. They are very grateful also to Dr. Ruth Gilbert, of the Division of Laboratories, New York State Department of Health, for confirmation of the bacteriological diagnosis of the strains isolated.

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Some Problems in Scarlet Fever

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THERE are many practical problems which still confront us in regard to scarlet fever but I do not presume to give the solutions to these unless they have been provided by the research workers whom I quote.

Trends in Morbidity and Mortality

We may first enquire whether we are now at the point of lowest incidence and mortality of scarlet fever. In different parts of the world where the disease is endemic it has gradually decreased in frequency and severity until now it plays a relatively insignificant part as a cause of death, even in the lower age-groups. In eastern Europe, of course, the disease still remains prevalent and severe.

In Great Britain, where scarlet fever is quite prevalent but very mild, a study of this aspect of the problem was recently reported by the Medical Research Council. Phases of great severity were shown to have alternated with ones in which the disease was very mild. That the change from mildness to severity may be very rapid is an interesting and significant point. The peak of scarlet fever mortality in Great Britain in the 19th century occurred in 1863 when the death rate in children under 15 years reached 399.6 per 100,000 and it continued to be a major cause of death until about 1880 when "some change occurred" and the decline in severity began and has continued until now. The death rate in the five-year period ending 1930 was 5.5 per 100,000.

A study of Ontario mortality data on scarlet fever by Dr. Mary A. Ross of the School of Hygiene, University of Toronto, covering the period from 1880 to 1929 showed that there has been a steady decline in mortality with intermittent rises. In most instances each peak has been necessarily below the preceding one and none has equalled that of 1882 when there were 27.9 deaths per 100,000. In 1929 the specific death rate was 2.3 deaths per 100,000 population. These figures cannot be directly compared with those for Great Britain since the latter deal only with the age-group under 15 years. Another point brought out by Dr. Ross was the decided shift in the mortality in different age-groups. In the first five-year period only 7.5 per cent of the deaths occurred in those 15 years and over while in the last period 21 per cent of the deaths were in that group.

Our own morbidity data show a steady fall in the number of cases. The highest point was reached in 1921 when there were 1,200 cases per 100,000 while 1932 saw the lowest with 50 cases per 100,000 population. The credit for the steady downward trend of scarlet fever is not given to the usual methods by which we attempt control, such as quarantine and hospitalization. Furthermore, the more recent efforts, search for carriers, swabbing throat of contacts

to determine the presence or absence of the presumed cause, streptococcus haemolyticus scarlatinae, are perhaps too new to have proved their worth, if any.

Numerous reasons for the long term variations mentioned above have been suggested, but it is doubtful if we can accurately assess the value of factors involved. Higher standards of living have undoubtedly improved the mass resistance to certain communicable diseases and therefore may be in part responsible. Changing social customs and changing industrial conditions are factors whose precise effect upon the trend it would seem to be impossible to determine.

I think that we can exclude the increase in susceptibles, the result of the natural increase of the human race, as an explanation of the long term cycle in scarlet fever. The influence of this factor is strikingly shown in such diseases showing definite periodicity as measles, but can hardly account for the long swing of scarlet fever. So far I have been unable to find that anyone has attempted to prove any theory on this point but the belief seems common that both incidence and mortality are in the "trough of a wave" and that at any time an increase may be expected.

FUNDAMENTAL CONCEPTS IN EPIDEMIOLOGY AND CONTROL OF SCARLET FEVER

There is, however, sufficient reason for optimism both in the increasing knowledge of the cause of the disease and in the progress being made toward developing specific means of treatment and control. The Lancet, for example, contains the following reference to the work of the Doctors Dick (1):

> "The main achievements are familiar: the identification of a haemolytic streptococcus as the causal organism; the demonstration that a soluble toxin produced by it was capable, when injected in sufficient quantity, of giving rise to the clinical manifestations of scarlet fever, including the rash; and the employment of this toxin as a test for and as a stimulus to the production of active immunity—the serum of actively immunized horses providing a specific antitoxin which is now widely used for treatment, for passive immunization, and for the blanching test."

In Manchuria four Japanese workers (2) reported the experimental production of scarlet fever by using haemolytic streptococci in the third and fourth subculture, isolated from a definite case; thus fulfilling Koch's postulates, which set out the necessary steps for proving a causative agent. Later they demonstrated that from an *epidemiological* standpoint this organism could be accepted as the cause. First they showed that the typical B type haemolytic streptococcus could be isolated from 100 per cent of the cases. Positive swabs were obtained in 14.7 per cent of Dick-test-positive primary school children; in 24.5 per cent of Dick-test-negative primary school children; in 27 per cent of nurses and attendants on scarlet fever cases, and in 28 per cent of the families of such patients. The rate of disappearance of the organism from the throats of patients was observed in 233 cases and it was found that 92.5 per cent became negative in five weeks.

In Edmonton Dr. Hall examined swabs from all scarlet fever patients prior to their discharge from the isolation hospital. Patients with positive throat swabs were kept in hospital and in most instances became negative in the sixth week. Since we could not say positively that the existing organism did not suggest a scarlet fever strain, some cases were released in spite of repeated positive cultures of haemolytic streptococci. The fact that special care was promised and presumably observed by the parents, plus the fact that positives were released if possible only where there were no other young children, may account for the fact that no secondary cases arose.

In the Japanese study referred to above, 5 per cent of susceptible children exposed to released cases with positive swabs developed scarlet fever. This represents a morbidity rate of 50 per thousand, whereas the prevailing rate for the city at large was only 3.7.

SCARLET FEVER ANTITOXIN IN TREATMENT AND PROPHYLAXIS

Although many dispute the value of scarlet fever antitoxin, more apparently favour it and its use is growing. Dr. Veldee of the United States Public Health Service, who has done much work on the serology of scarlet fever, says:

> "That the antitoxin has a specific neutralizing effect on the toxin *in vivo* is indicated by the decrease in the duration of the rash, by a change in the character and extent of the desquamation, and by a reduction in the number of complications. That it failed to neutralize completely the damaging effect of the toxic substances produced by the scarlet fever infections is suggested by the failure of the rash to disappear promptly, by the continuation of the fever, and by the appearance of complications in a certain number of serum-treated cases.
>
> "These failures may have been caused by (a) too small a therapeutic dose, (b) an improper method of administration, (c) administration too late in the disease, or (d) an inadequacy of antitoxin to neutralize all of the toxic substances elaborated in this disease. It is our belief, and this is confirmed by other clinicians, that early administration of antitoxin and its rapid dissemination throughout the body of the patient are essential."

Numerous authorities strongly recommend the administration of antitoxin by the intravenous route. Using this method, it is found that the maximum titre of antitoxin in the general blood stream is reached within three hours, but when administration is intramuscular or subcutaneous the same stage of diffusion is not reached until at least twelve to thirty-six hours have elapsed.

Regarding the time of administration, it is found that the best results are obtained if the antitoxin is given before the end of the third day of the disease though some benefit has been noted following administration even as late as the sixth day.

Scarlet fever antitoxin may also be used to passively immunize the immediate contacts of cases who may be susceptible, but I hesitate to recommend it mainly because the duration of immunity is short, not more than three weeks. The same may be said of the use of diphtheria antitoxin, but in the latter disease we can definitely identify carriers and cases in the incubation stage and

by their treatment and segregation protect the contacts from prolonged exposure. In scarlet fever, however, we have the long duration of infectivity and the present difficulty of positive identification of carriers. Therefore, the risk to the susceptible contact may be continued after the passive immunity has gone and, if the contact later becomes a patient and we are compelled to use antitoxin for treatment, we may then have a sensitized patient.

SOME ASPECTS OF ACTIVE IMMUNIZATION

But can we provide immunity, active and relatively lasting immunity, by the use of scarlet fever toxin prepared for that purpose? In the past I have not been advocating its use for several reasons. Firstly, I was anxious to await the acceptance by the public of immunization against diphtheria and felt that any untoward results in anti-scarlet fever treatment might be reflected on the use of diphtheria toxoid. Secondly, in view of the low incidence and mortality from scarlet fever I felt that we might safely wait and watch development. Thirdly, reactions, harmless but nevertheless annoying, are frequent. Finally, there is the objection that to get maximum immunity five doses must be given and I think that most of us sympathize with parents in their distaste for seeing their offspring punctured so frequently.

We now appear to be approaching the stage where these suggested objections can be, or should be, disregarded. The use and value of anti-diphtheria treatment has become firmly established, and therefore that objection is overcome. Furthermore, if the prophets are correct as to the possibility of an upswing in incidence we should seriously consider recommending active immunization.

Very hopeful news is appearing regarding the detoxification of scarlet fever toxin by the use of formaldehyde and the preparation of a scarlet fever toxoid. In the June 1933 issue of the JOURNAL there appeared an article by Veldee whom I previously quoted. In this article he indicated that his study had been pursued in an effort to solve problems in methods of manufacture, titration, dosage, and immunity produced so that the manufacture of scarlet fever toxoid might be placed on a practical basis. He concluded, in part:

> "Tests on susceptible persons indicate that the toxoid . . . described in the text may be given in a three-dose method to children under 15 years of age without subsequent reactions except local erythema in a majority of children, accompanied by induration in a few and tenderness in a still smaller number, and mild systemic symptoms (slight fever, headache) in only an occasional individual. Of 1,168 persons re-tested . . . one month after the last injection, 972 or 83.2 per cent were Dick negative."

For many months I considered the possibility of combining diphtheria toxoid and scarlet fever toxin as one immunization scheme and, if so, effecting protection against the two diseases in only five injections instead of eight. There seems to be no objection so far as mixing is concerned; we frequently use mixed vaccines. One difficulty that occurred to me was the difference in interval between doses, one to two weeks for scarlet fever toxin and three to five weeks for diphtheria toxoid, as recommended by the Connaught Labora-

tories. In New York satisfactory results seemed to have been obtained using an interval of one week in the administration of diphtheria toxoid and I therefore proposed to try a two-week interval for the combination, using suitable strengths of scarlet fever toxin in order to get the recommended dose with the minimum volume.

In March, 1934, we began the use of this combination of scarlet fever toxin and diphtheria toxoid (Connaught Laboratories preparations). The schedule of dosage used is given in the following table:

		Scarlet Fever Toxin		
Dose	Diphtheria Toxoid	Amount	Strength	S.T.D.
1	1/2 cc.	1/3 cc.	B	330
2	1/2 cc.	1/4 cc.	D	1,250
3	1 cc.	1/4 cc.	E	2,500
4	——	1 cc.	D	5,000
5	——	1 cc.	E	10,000

Thus in five doses the child would receive the recommended 2 cc. of diphtheria toxoid and slightly more scarlet fever toxin than is ordinarily recommended. Up to the middle of March, 1936, we have treated 706 children with the combined diphtheria toxoid and scarlet fever toxin; 149 others had only 1, 2, or 3 doses; more than one-third of these stopped treatment after the third dose because they had then completed the diphtheria treatment, the main objective. So far as I have observed, reactions are neither more severe nor more frequent with the combination than with the unmixed scarlet fever toxin.

In addition to the above, we have completed the treatment of 200 with the unmixed scarlet fever toxin and 380 more are receiving treatment. No subsequent Dick test has been used as yet to determine the efficacy of the treatment, but up to the present time only two children so treated have developed scarlet fever. This is a distinctly encouraging finding because we have had an outbreak of the disease affecting all parts of the city in which there were 220 cases in four months, our yearly average for four years being 61 cases.

REFERENCES

(1) The Lancet, Jan. 20, 1934, p. 139.
(2) Br. J. Child. Dis., Apr.-June, 1931, p. 89.

Fumigation

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A RECENT amendment to the Public Health Act in Ontario limits the use of the term "fumigation" to disinfestation by hydrocyanic acid gas or any cyanide compound.

Parasitic infestation is more effectively controlled by the use of these agents than by most, if not all, other means at our disposal. Household fumigation for the extermination of bed bugs, moths, cockroaches, fleas, and other pests has increased until now the business is of large proportions. Fumigation is carried on by a considerable number of small concerns and by individuals, and where such a toxic substance as hydrocyanic acid is used it is extremely important that proper precautions be taken against accident. It might be noted that most of the twelve fatalities in the last five years have been in connection with household fumigation.

Hydrocyanic acid is a colourless gas with an odour of bitter almonds. The odour is not perceptible to many individuals. The specific gravity of the gas is 0.935 so that it is somewhat lighter than air. The effectiveness of hydrocyanic gas for disinfestation is due to its high toxicity and its great diffusibility and penetrating power. While there are fumigants other than this gas which are effective for special purposes, there is no substitute.

Table I shows the effects of breathing various concentrations of the gas which is physiologically active to a high degree:

TABLE I

Physiological Response to Various Concentrations of Hydrocyanic Acid Gas*

	Parts of Hydrogen Cyanide per Million Parts of Air		
Slight symptoms after several hours' exposure	20	to	40
Maximum amount that can be inhaled for 1 hour without serious disturbance	50	to	60
Dangerous in 30 minutes to 1 hour	120	to	150
Rapidly fatal	3,000		

*Kobert, R., Kompend. der prak. Toxicol., Stuttgart, 1912.

Cyanide compounds are protoplasmic poisons, inhibiting or preventing cellular oxidation. In high concentrations hydrocyanic acid causes death in a short time by paralysis of the respiratory centre. In house fumigation, where eight ounces of hydrocyanic acid per thousand cubic feet is about the maximum dosage, the concentration would be about 0.7 per cent by volume or 6,700 parts

hydrocyanic acid per million of air. The concentrations usually range from 0.2 to 1 per cent by volume and these concentrations are not maintained over the whole period of gassing as the gas is absorbed in walls, fabrics, etc., and leaks out through cracks and crevices in the house. The inhalation of sublethal amounts will cause nausea, dizziness, vomiting, and if additional quantities are inhaled the symptoms become more serious. With heavy exposure to cyanide gas there might be a slight burning sensation of the skin, followed by a peculiar sensation of weakness. This warning should be heeded at once. Unconsciousness follows and breathing ceases very soon after inhaling one thousand or even a few hundred parts per million. Hydrocyanic acid is also absorbed through the skin and the same symptoms are evident as when the gas is inhaled. Long exposure, even when a gas mask is worn, should be avoided. To revive a victim of hydrocyanic acid poisoning, artificial respiration must be applied at once and should be persisted in if the first efforts at resuscitation are unsuccessful. No person who is engaged in the handling of cyanide compounds or who is in the business of fumigation with hydrocyanic acid should be without a practical working knowledge of a method of resuscitation.

In order to control the use of cyanide products used for fumigation, legislation has been enacted in some of the provinces of Canada as well as in many states and large cities. In Ontario, amendments to the Public Health Act and regulations passed under it, provide for licensing by the Provincial Department of Health, of those conducting fumigation with hydrocyanic acid gas. The granting of the licence depends upon at least an elementary knowledge of cyanide compounds, detailed knowledge of the procedure in fumigation including all precautions to be adopted, the general attitude towards this work, and physical fitness. No one may engage in fumigation without a licence unless exemption is given in writing by the Minister of Health.

The regulations indicate in detail the procedure which must be adopted in preparing the premises for fumigation and for thorough airing at the end of the gassing period before the premises are re-occupied. A permit for each fumigation is to be obtained from the local medical officer of health after the premises have been inspected by the fumigator and the details recorded on this permit are to be adhered to throughout the operation. The Act makes it possible for a municipality to require a fee of $1.00 for each permit.

There is also required to be employed for premises used for human habitation a warning and expulsive gas which will be evolved simultaneously with hydrocyanic acid gas in order that, in addition to all the precautions required, anyone coming within range of this substance shall be forced to retire from exposure to the gas. It is at once apparent that the use of warning gas can in no way be allowed to take the place of any of the other precautions which are required. However, as an additional safeguard it appears to have a definite place.

There has been a good deal of difference of opinion as to whether the use of warning gas is necessary or desirable. The perfect warning gas has not

yet been discovered although quite a few have been tried out both in the laboratory and in practical use. There appears to be no good reason, however, for omitting what additional safety may be reasonably expected from its use. It has been impossible to ensure the satisfactory use of a warning gas unless it is incorporated with the cyanide product being used, so that both the hydrocyanic acid gas and the warning gas are emitted simultaneously.

The warning gases, which are commonly employed and which are emitted simultaneously with hydrocyanic acid gas from products approved by the Provincial Department of Health, are chloropicrin and cyanogen chloride. Chloropicrin, which is a heavy liquid, is incorporated, along with hydrocyanic acid, in paper discs which are put up in sealed metal containers. On exposure to the air the discs lose the hydrocyanic acid and chloropicrin by evaporation. A special opener for the can containing these discs should be used. The use of an ordinary can opener consumes much time during which the operator is exposed to the escaping gas. Cyanogen chloride is evolved when a mixture of sodium cyanide and sodium chlorate is acted upon by dilute hydrochloric acid, the reaction producing also hydrocyanic acid. Both these warning gases are toxic although not nearly as much so as hydrocyanic acid.

The regulations name the type of premises in which hydrocyanic acid gas shall *not* be employed without the simultaneous use of a warning and expulsive gas. The products referred to are listed and this list has been sent to each medical officer of health.

The information which the fumigator is required to give in his application for a permit merits special notice. Of importance is the name, amount of the fumigating material to be used, the location of the building or portion thereof to be fumigated, and the cubic feet capacity of such building or portion. A minimum quantity of such material per thousand cubic feet is necessary in order to ensure an adequate amount of warning gas in the mixture and each fumigation should be carefully checked on these and other points at the time of the actual fumigation.

Inspectors should be supplied with gas masks so that they may enter with safety a house in which a fumigator is working. The fumigator and all persons employed by him are each required to wear a gas mask while in the building being fumigated. An accurate record of the length of time during which the gas canister has been used in required of the fumigator and refills should be carried on all fumigations.

Locking or barricading all entrances to a building being fumigated is one of the precautions to be taken against accident which should be stressed as of the utmost importance. For public protection warning placards should be attached to each door or entrance before the fumigator takes fumigating material into a building and a guard or guards should be on duty.

Fumigators doing household fumigation must carry insurance sufficient to pay an indemnity to the limit of $3,500 in case of an accident to an employee

and to the limit of $10,000 for one person, or $20,000 in the case of two or more persons.

Many of the precautions called for in the regulations which may appear to be valueless from the point of view of the fumigator are really extremely important. The fumigator may feel that he is being hampered in his work and put to needless expense because he is compelled to observe certain regulations. In the past it has been shown, however, that omitting certain details in the precautions to be taken has led to fatalities.

Accidents have occurred through failure to properly notify occupants of premises which are to be fumigated, and occupants of adjoining premises as to what is to be done. The Act plainly states that the fumigator must notify in writing all such persons as to the time of fumigation and the hour at which it shall be safe to enter such premises. Cases are known where guards have been withdrawn from premises before the airing out period is completed or at some time during the fumigation. Under certain weather conditions it is a difficult matter to completely air out a building so that it is free of gas. Under these conditions it may be necessary for the fumigator to exceed the four hour airing out period in order to ensure the safety of the occupants on their return.

Because of the details which must be observed and the opportunities, if such exist, for fumigators to evade safety requirements, it is essential that inspection be thorough and that even minor infringements of the regulations be looked upon seriously. This inspection is a function of the local municipality as required by the Public Health Act, so that medical officers of health should be familiar with the regulations in detail, and on the lookout for fumigations with cyanide compounds which are not conducted according to the approved procedure. It is only in this way that those who are not qualified to undertake the work will desist and that those fumigators who are not prepared to abide by the regulations, if such there be, will be eliminated.

The Act gives every municipality the authority to enact by-laws respecting fumigation not inconsistent with the provisions of the Act and the regulations.

The Provincial Department of Health is at all times ready to assist medical officers of health in the protection of the public and the fumigators themselves in the use of these dangerous materials.

The Doctor in Industry*

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LESS than two decades ago, physicians in Canada were given little or no place in the industrial picture. The situation has been so altered in recent years that nearly all the major industries, and many of the smaller ones, consider a surgical service at least, and many a medical service as well, an integral part of their companies.

Many things have led to this altered attitude on the part of industry. The first and probably the most important factor has been the well organized and gradually developing protection given industry in Ontario through the Workmen's Compensation Act. Although this Act in its application may at times be criticized, it has been an exceptionally good one for industry, for the workman, and for the attending surgeon. The service and protection which this Act demanded made it almost imperative for the larger industries to make use of surgical services.

The hazards which have developed with the more complicated industrial operations, particularly by way of poisons, dusts, and fumes, have likewise made it imperative for industry to protect itself through the provision of medical services. In this connection, the assistance and supervision capably given by the Industrial Hygiene Division of the Provincial Department of Health have been of great value in those industries with established medical services and in stimulating others to provide such services when the necessity demanded.

In addition to these stimulating influences, there has been a growing tendency on the part of the leaders in industry to provide for their workmen better working conditions, as well as eliminating as far as possible the illnesses which decrease efficiency in operation.

Not in the industrial field alone has a change occurred. Not many years ago the profession as well as industry frowned on, rather than sanctioned, medical and surgical services for companies. To-day it is recognized both in teaching and in practice as a very specific and important division of medicine.

Still we may hear the question asked: "When should an industry have a physician or surgeon personally interested in the welfare of its employees?" This cannot be answered in blanket fashion. Two very definite statements can, however, be made:

1. An industry, no matter how small, should have the supervision of a physician if specific hazards exist.

2. All industries with five hundred employees or more should have medical and surgical services. The number of employees is not always the criterion of the necessity. It is, however, this number which makes the service essential.

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TYPES OF SERVICE

The system by which the doctors render service in industry varies greatly and may include anything from very cursory supervision to full-time service. The types of service rendered at present might be classified as follows:

1. A doctor may be on call for accidents, be paid through the Workmen's Compensation Board allowance, and the case be treated at his own office. In many of these companies there are first aid men or nurses.
2. The doctor may be on call and the case treated definitely at a plant station or hospital, the doctor receiving as remuneration the compensation allowance only.
3. The doctor may be in attendance at the plant for certain periods, receiving a small retaining fee plus compensation charges.
4. The doctor may be in attendance on a part-time basis, receiving a salary or retaining fee only. This type of service is a most satisfactory practice, both in large and small industries, over a period of years including peak and slack periods.
5. The doctor may give full-time service and have no financial interest in outside practice or in other industries. This, for a large industry, might appear to be the most satisfactory system. It has, however, some distinct disadvantages in comparison with the system employing a part-time service on a salary basis. The success of any scheme, however, depends not so much on the system as on the man applying it.

In smaller industries the industrial and medical service usually falls under the management of one of the chief executives. In the larger industries it comes under the supervision or direction of the personnel division. In this division it is in close contact with the employment department, the safety engineering department, and the insurance department. Close contact and co-operation with these departments materially aid the efficiency of the service.

AN ADEQUATE SERVICE

To give an adequate industrial medical and surgical service, the doctor should arrange for the performance of the following functions:

1. Pre-employment physical examination of all employees.
2. Physical examination at regular intervals of all employees.
3. Physical examination of all employees when returning to work after illness.
4. Diagnosis and, in minor cases, temporary treatment of workers applying to the plant hospital for medical care.
5. Surveys of plant hazards and plant operations likely to involve hazards.
6. Diagnosis and treatment of all injured employees.
7. Surveys of the general environment of employees and the general sanitary conditions of the factory.
8. Spread of health publicity and first aid instruction by lectures, publications, etc.

Physical Examination

Pre-employment examination of workers is an important part of an adequate medical service. It prevents the introduction of such contagious diseases as tuberculosis, active venereal diseases, etc., into the factory working force. It prevents the employment of workers with such diseases as diabetes, nephritis, pyelitis, advanced anaemia, etc. It gives the physician an opportunity to see that the prospective worker is being placed at work for which he is physically fitted. The assignment of workers to such tasks not only lessens the liability to accident but also increases efficiency without undue strain on the defective worker.

These examinations need not be intensely complete but, if done at all,

should include a brief history of previous employment and illnesses. The latter is very difficult to obtain from an energetic employment seeker. The examinations should include gross examination of vision, routine chemical urinalysis, and an estimation of weight. All of these may be done by a medical clerk or an attendant with relatively little training.

The physical examination proper, because of the time factor, must be one which might be considered superficial and yet sufficient in detail to place the worker in a category for the particular employment desired or, if necessary, to reject the applicant. In certain diseases it is an opportune time to advocate treatment. These examinations can be most quickly done with the workers placed in individual cubicles, and suitable clothing removed. By this method and the use of a medical clerk to record findings, the examination proper, barring special cases, should not average more than five to six minutes per person. In peaks of employment it may be necessary to recall certain individuals for more detailed examinations.

Accurate permanent records of these examinations should be kept. A suitable medical form, adjusted to suit the requirements of the industry concerned, may be used for the same workman from year to year. Space on it may be utilized for illnesses causing loss of time and brief summaries of all industrial injuries.

Re-examination of Employees

At regular intervals all employees should be physically rechecked. The frequency of examination is dependent not only on the type of industry but also on the category of the employees when previously examined. Physically fit workers at regular duty should be examined once yearly. Employees exposed to particular hazards, e.g., lead, may require a monthly check-up.

Physical Examination after Illness

Employees returning to duty after illness should be carefully examined and without this function a medical service is not complete. Many workers are so keen to return to duty that they attempt to do so before they are physically able. The attending physicians may or may not be agreeable to re-employment, but should not be expected to make the final decision as they have not an intimate knowledge of the workmen's operation and environment.

Medical Care

In this sphere the industrial physician, unless his agreement calls for complete care, should be very cautious and diplomatic, particularly in his attitude toward requests for medical diagnosis and care. The family doctor's position should be recognized and respected by rendering only an emergency service.

Surveys of Plant Operations and Hazards

These are necessary first of all to make the industrial physicians or surgeons familiar with operations, not only from the standpoint of the hazards of trauma

and the type of injury to be anticipated, but also from the standpoint of the hazards of poisons, dusts, fumes, etc.

The extent or frequency with which these surveys should be made varies greatly with the industry concerned. In industries with little or no change of operation or materials the necessity is less urgent. It is very easy, even with frequent surveys, to encounter difficulty by a changing operation in the use of such treacherous materials as those which contain a relatively high percentage of lead.

Diagnosis and Treatment of all Injured Employees

It is the primary duty of the industrial surgeon to supervise and care for all accident cases. It is this division of the service which should be closely in touch with the department of accident prevention, if such exists in a factory. If, as in smaller industries, it does not exist, it may be the duty of the industrial surgeon in many cases to play a part in that service.

In the care of the injured, he must be closely assisted either by first aid men or nurses. Both of these types of attendants have rendered and are rendering industry excellent assistance, and both have their place in larger factories. The well-trained industrial nurse is so superior in comparison that there should be no difficulty for industries to make a choice when outlining new services. Accurate records in the form of a carefully prepared card for every injury is of the utmost importance for daily use in a plant hospital.

Surveys of the General Environment of Employees, and the Sanitary Conditions of the Factory

Many plants may be so carefully built and cared for that this type of survey is rarely, if ever, needed. In many, however, where old, poorly ventilated buildings with inferior plumbing are in use, and in which operations are frequently being changed, these surveys may be of great value not only as a protection to the health of the workmen but also in increasing efficiency. This protection also stimulates interest of the worker in his environment and work. The co-operation of the maintenance division of the industry and its chief executives is of necessity required to make such surveys of any practical value.

Spread of Health Publicity and First Aid Instruction

Most large industries and many small ones to-day provide for their employees yearly courses in first aid instruction. This may be attended voluntarily, or in some instances attendance may be requested. They offer opportunity for providing the worker with such instruction as that given by the St. John's Ambulance Association, as well as other instruction which may be useful for the particular industry concerned. It is unwise for all employees to take such courses; but preferably only those who can appreciate the value of such instruction, and be capable of using reasonable judgment in its application.

The doctor's responsibility in providing a service such as is briefly outlined in this short paper is a major one, but one which most industrial physicians and surgeons enjoy rendering, and one which most companies deeply appreciate.

Travel Habits and Control of Odours*

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THE majority of papers available and referring to this subject deal with the odours arising from garbage treatment and sewage disposal plants. A few deal briefly with industrial plants, but, since the latter are usually located in highly populated areas, means have generally been provided to reduce the offence to a minimum. A tolerance may result from acquaintance and there may also be such a demand for a manufactured article that the local inhabitants will countenance the situation. Again, since no agreed measuring stick has been provided and people react differently to the same odour, it makes it very difficult to render a decision acceptable to all. The personal equation cannot be overlooked when considering odours and their elimination.

A sewage treatment plant may be directly or indirectly responsible for an undesirable odour situation, although the newer plants are endeavouring to curtail this trouble by proper designing and operation. The sewage coming to the plant may become septic and create a nuisance en route. Undesirable odours may originate in the plant proper, the general offender being hydrogen sulphide. During the operation of sludge or screenings disposal, bad odours are frequent. The plant effluent may discharge into a stream incapable of supplying sufficient oxygen during the summer months, in which case a septic condition is the result. There are, therefore, many sources of odour troubles in and around a disposal plant, so that it is generally desirable for both the chemist and the engineer to consult jointly on the possible cause and cure.

Prior to this age of densely populated cities, many communities were located on a main water-way and the sewage was discharged directly into it. Due to the rapid increase in population it was found necessary to treat the sewage prior to discharge, in order to reduce the pollution load on the stream receiving it. However, as the various industries located in the city discharged their respective wastes into a common sewage carrier, the final influent to the disposal plant in many cases became very complex and sometimes extremely difficult to handle.

The compounds which make up a large percentage of the organic portion of suspended matter in sewage are proteins—consisting of carbon, nitrogen, oxygen, hydrogen and sulphur in varying proportions. The micro-organisms and enzymes, with the inorganic compounds present, cause putrefaction as soon as the oxygen supply is depleted. Putrefaction, in turn, may yield a great variety of compounds. Fatty compounds, mainly carbon, hydrogen, and perhaps traces of oxygen, can also give off offensive odours. The starches and sugars may or may not cause trouble.

**Presented before the Public Health Engineering Section at the Twenty-fourth Annual Meeting of the Canadian Public Health Association, Toronto, June, 1935.*

Inorganic compounds in solution or suspension, which cause odours, are the sulphides or sulphates, liberating hydrogen sulphide.

METHODS OF ODOUR CONTROL IN SEWAGE PLANTS

Writers have expressed varying remarks concerning odours originating from sewage disposal plants. A few may be of interest.

One states: "Odours of aerobic treatment are less offensive than anaerobic; also, fresh sewage on trickling filters is not noticeable over 100 yards, while from septic tanks, up to ½ mile distant."

Another states: "Odours from decomposing sewage do *not* cause typhoid fever, smallpox, scarlet fever, and such contagious diseases. They may, however, reduce the comfort and happiness and, consequently, in a sense, the health of the people subject to them."

Since opinions vary so widely, it is now necessary to consider not only the public reaction but the economics entailed in sewage plant construction and disposal. The public demand odourless disposal and may resort to legal action in an effort to get rid of such a nuisance. Isolated plant sites are sometimes difficult to procure at a reasonable cost. During recent years plants have been constructed in close proximity to residential sections. Such works may involve a greater initial capital cost and probably an added cost in the effort to control all odours, but in the final analysis may be the more reasonable solution of the problem.

Many additional years of service have been added to old and obsolete plants by the incorporation of necessary odour control measures. Similarly, old plants have been remodelled at a reasonable cost, which was possible only by the adoption of present-day odour control measures.

Some of the newer disposal plants, and particularly the smaller ones located close to a residential section, have been carefully shielded by planting trees, shrubs, etc., with the result that the odour is scarcely noticed. The trees generally planted are the coniferous and nut-bearing types, with shrubs of the honeysuckle group.

Fresh domestic sewage is not offensive. If the sulphates are high, hydrogen sulphide generally results and can be controlled by chlorination. Chlorine has been used to control odours in and around sewage plant buildings. Accurate control of the gas is essential and it must be liberated at locations where proper diffusion can be obtained. Chlorine seems to have a definite place in a disposal plant, for, in addition to controlling septization and odours, it can be used in the production of home-made ferrous or ferric chloride, chlorinated copperas, partial reduction of the biochemical oxygen demand in stream loading, and control of aquatic growths in streams below the treatment plant.

The proper application of air has also been a means of controlling many odour difficulties. In some plants pre-aeration has been of extreme value, while, of course, in the activated sludge system it is indispensable. If this type of plant has been properly designed and is efficiently operated, there is practically no offensive odour given off.

In some plants odours occur where the liquids coming to the plant may become agitated, as would be the case when they flow over a weir. Activated carbon has been used to advantage at these points. Racks are used to cover the weirs, on which carbon is spread out in a thin layer absorbing the gases. This procedure has been used to advantage at points where septic sewage is discharged from an open sewer into a major water supply and the odour situation has been entirely eliminated.

It is quite customary in the more recent sewage plant installations to dewater and incinerate the sludge and screenings. It is apparent that there is a definite temperature range between which the sludge and screenings can be burned without causing serious offence and the manufacturers of incinerating equipment quote at length on the question of temperature.

ODOURS IN INDUSTRIAL PLANTS

Many obnoxious gases, particularly in industrial plants, can be condensed in spray water or trapped as a gas in a special compartment, and, in both cases, oxidized by contact with chlorine. There are some gases on which chlorine has no effect and which cannot be eliminated. This situation may, ultimately, result in the necessity of moving the plant to an uninhabited zone.

The general use of deodorants must be considered very carefully. They do not eliminate odours, but simply disguise them, and it is sometimes questionable if the disguise is an improvement over the original.

Industrial plant odours vary in their consistency and, similarly, in their travel habits. It has been found impossible to make a mathematical calculation, even though the variables remain constant—such as temperature, humidity, wind velocity, ground contour, etc. Some odours will be very offensive for a distance of 100 feet around the plant and hardly discernible elsewhere; others will travel distances up to a mile and, seemingly, intensify in strength en route.

Reduction plants sometimes give off gases that are of nauseating quality and strength even eight or nine miles away. They are more offensive after sundown and during the night, definitely proving the deodorizing power of the sun's rays. Some plants, particularly those manufacturing definite types of oils and fats, have capitalized on the ability of the sun to assist them in their odour difficulties.

It is very interesting to read lawyers' briefs and the testimony given by experts concerning a nuisance, because of their opposing views on the same subject. It seems to depend on which side of the case they are retained as far as the evidence is concerned. It has already been pointed out that there is no measuring stick concerning odours and that people will, conscientiously, give contradictory opinions concerning the same offence.

Several years ago I was called in to assist a number of the local packing houses in eliminating a very obnoxious odour liberated from the man-holes of a common sewer line. The condition was very severe over a distance of several miles of pipe line, the local health authorities were threatening legal action, and all sorts and types of treatments had been tried. The prime offender in this

instance was water in which various fumes had been condensed, although in appearance it was still colourless and sparkling. It was discharged into a common sewer, into which the general plant waste, scrubbing water, etc., found its way. It was never possible to measure the quantity of water involved, although the flow only partially filled a two-inch pipe line. After considerable experimenting it was found that, until a definite amount of chlorine had been administered, there was no change in the intensity of the smell. When the critical point was reached the odour was eliminated and any excess in chemical application promptly came off as chlorine fumes or was absorbed in the common sewer in oxidizing the other constituents. This treatment seemed to render satisfactory results to all concerned.

Another interesting experiment was in connection with the manufacture of fertilizer from fish. The plant concerned is located close to an inhabited area and when the wind came from a certain direction the stack fumes were extremely objectionable. Many remedies were tried, without success. The plant is in a fishing community and any portion of the catches brought in by the trawlers and not sold for domestic requirements was purchased by this company. They passed the fish through grinding machines and removed the moisture by placing them in a steam-heated, revolving compartment from which the fumes in question emanated. It was possible to instal a retention chamber between the revolving drum and the stack, into which chlorine gas was admitted to oxidize the fumes. No further trouble of serious nature was reported.

In general, however, fumes are dissipated more rapidly in the stronger winds on account of dilution. On the lighter breezes the odour is more pronounced at nearby points and particularly when the humidity is high. Naturally, high stacks help the situation considerably as far as nearby residents are concerned, but the above remarks are still applicable.

It has been shown that some of the so-called clinging odours—*i.e.*, those which will stay in your clothes from twelve to fifteen hours after leaving a plant—have the ability to travel great distances from the source.

In the manufacture of linoleums and oil-cloths odours are given off which travel many miles. This is particularly true of the linseed oil industry.

From the above, one might wonder if odours should be classified by a scale of descriptive terms. Could they be analysed to discover the atoms that make them agreeable or offensive—and, incidentally, find out what is needed to neutralize them?

A typical and practical illustration is afforded in the home, where if a little baking-soda is added to the water in which cabbage is being cooked, little or no odour is present.

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PARATYPHOID A IN CANADA

IN this issue of the Journal a paper by Foley, Faille and Brandon records the first reported cases of paratyphoid A in Canada. This disease, common enough in Europe, Africa, and India, is not very common on this continent. In France paratyphoid A infection was practically unknown in 1914, but according to Leboeuf and Braun it accounted for 92 per cent of all the enteric fevers a year later. Following upon this wave of paratyphoid A infections came a preponderance of Schottmüller (paratyphoid B) infections. Both forms were early present in the British white army and both later diminished in frequency. These A infections were apparently introduced by carriers from North Africa and India respectively. Vaccination among the British troops was, it will be recalled, at first directed only against the typhoid bacillus and this doubtless explains the initial recorded predominance of paratyphoid infections which in time were checked by specific immunization.

Waves of incidence corresponding to the one in the British Army also prevailed in Germany as recorded by Bumke; at first *S. paratyphi A* infections and from 1915 onwards Schottmüller infections were in excess, so that finally among convalescents there were twice as many carriers of the B organism as of the true typhoid bacillus. Indeed paratyphoid fever, dysentery, and influenza were the main scourges in the German army during the Great War. The rise and the persistence of this organism in Germany seem definitely related to failure to adopt paratyphoid vaccination.

One wonders whether the paucity of recorded cases of paratyphoid fever A in America is an actual fact or merely represents a failure to find the cases. Perhaps many are mild and therefore never diagnosed. That paratyphoid A is in fact a rare disease in Canada is, however, supported by the records kindly submitted by Mr. M. H. McCrady, Director of Laboratories of the Bureau of Health, Province of Quebec. These data show that of 10,356 specimens of blood cultures, faeces, and urine submitted for a diagnosis of enteric disease during the past

3 years, none were positive for paratyphoid A. Of 222 serum agglutinations, 5 only were positive for paratyphoid A and it is quite possible that some of the positive sera may have been from vaccinated individuals who may, therefore, conceivably never have been specifically infested or infected at all.

The outbreak which is recorded in the article by Foley, Faille and Brandon deserves considerable study. The careful investigation made by these workers demonstrates dramatically the potential danger to a community of even one carrier. To have established the fact that paratyphoid fever A really may and does exist in Canada is a significant contribution to epidemiology and public health in this country. It should serve to put workers in all branches of medicine on their guard.

This report, however, teaches us other important lessons. It emphasizes the danger which food handlers who have not been bacteriologically examined before being employed, may be to all their fellows. Furthermore, the story of defective sanitation in this paratyphoid A epidemic is a valuable reminder that we should be on the alert for the recurrence of such incidents elsewhere. Studies such as this one are highly commendable. We hope there may be more like it.

NUTRITION AND THE DEPRESSION

RECENTLY Dr. James McLester, past president of the American Medical Association, investigated the effects of the depression on the nutritional level of persons in the United States. The results were presented to the American Institute of Nutrition in March. Dr. McLester examined data for school children and for two groups of adult men, the first employed throughout the past five years, the second on relief during the same period. The data show clearly that children are in better condition than similar children were five years ago and that the men on relief have been better nourished than the employed men. Dr. McLester also sent questionnaires to representative physicians throughout the United States. The replies were unanimous in stating that the depression has not lowered the nutritional level but has, in fact, raised it. This has been due largely to increased education along nutritional lines and to the consequent better choice of foods.

The information collected by Dr. McLester is reassuring since there is a widespread opinion, largely engendered by agitators, that people on relief are suffering acutely. This investigation further emphasizes the need for dietary surveys and nutritional work of a similar kind in Canada. All too frequently we hear loose statements regarding nutritional needs in this country. Unfortunately we have no exact information as to the food habits of Canadians. Precise information is badly needed and should be of great assistance in public health.

E. W. McH.

REPORTS FROM THE ANNUAL MEETING*

Part II

REPORT OF THE COMMITTEE ON ARCHIVES

IT is with deep regret that the Committee on Archives reports the loss by death of the following members during the past year:

Dr. C. O. Apps, Medical Officer of Health, Mount Pleasant, Ontario.
Dr. C. A. Baragar, Commissioner of Mental Institutions and Director of Mental Health for Alberta, Edmonton.
Dr. C. M. Bayne, Divisional Medical Health Officer, Department of the Public Health of Nova Scotia, Halifax.
Dr. R. L. Blackadar, Port Maitland, Yarmouth County, Nova Scotia, Medical Officer of Health for Yarmouth Municipality.
Dr. F. Blanchard, Medical Officer of Health, Lindsay, Ontario.
Dr. A. W. Brodie, Medical Officer of Health, Prince Albert, Sask.
Dr. D. G. Cameron, Medical Officer of Health, Medstead, Sask.
Dr. L. H. Campbell, Medical Officer of Health, Bradford, Ont.
Dr. D. M. Chisholm, Medical Officer of Health, Port Hood, Inverness County, N.S.
Dr. J. L. Churchill, Medical Superintendent, Nova Scotia Mental Hospital, Halifax.
Dr. Jules Constantin, Inspector of Health Units, Roberval, Lake St. John, Que.
Dr. Douglas Corsan, Medical Officer of Health and Medical Inspector of Schools, Fernie, B.C.
Dr. David Donald, Medical Officer of Health, Esquimalt Rural District, and Medical Inspector of Schools for the City of Victoria, B.C.
Dr. J. H. Ferguson, Medical Officer of Health, Springfield, Ont.
Dr. H. B. Ford, Medical Officer of Health, Tompkins, Sask.
Dr. R. S. Frost, Medical Officer of Health, Kinmount, Ont.
Dr. A. S. Gibson, Medical Officer of Health, Craik, Sask.
Dr. W. A. Groves, Medical Officer of Health, Fergus, Ont.
Dr. Andrew Henderson, Medical Officer of Health and Medical Inspector of Schools, Powell River, B.C.
Dr. O. G. Ingham, Medical Officer of Health and Medical Inspector of Schools, Nanaimo, B.C.
Dr. L. W. Johnstone, Medical Officer of Health, Sydney Mines, Cape Breton County, N.S.
Dr. A. E. Kelly, Medical Officer of Health, Swift Current, Sask.
Dr. F. E. Lawlor, retired Medical Superintendent of the Nova Scotia Hospital, Halifax.
Dr. J. D. Leeson, Medical Officer of Health, Aylmer, Ont.
Dr. R. R. McClenahan, Toronto, Ont., formerly of the Department of Health of Ontario.
Dr. A. McDermid, Medical Officer of Health, Severn Bridge, Ont.
Dr. H. S. McDonald, Medical Officer of Health, Dresden, Ont.

Presented at the Twenty-fifth Annual Meeting of the Canadian Public Health Association, Vancouver, B.C., June, 1936.

Dr. Nat MacDonald, Medical Officer of Health, Sydney Mines, Cape Breton County, N.S.
Dr. D. A. MacGregor, Medical Officer of Health, Barry's Bay, Ont.
Dr. G. R. Morse, Medical Officer of Health, Saskatoon, Sask.
Dr. T. J. Park, Medical Officer of Health, Amherstburg, Ont.
Dr. W. F. Park, Medical Officer of Health, Anderdon Township, Amherstburg, Ont.
Dr. William Reid, Medical Officer of Health, Wyoming, Ont.
Dr. J. Semple, Medical Officer of Health, Kisbey, Sask.
Dr. C. W. Stramburg, Medical Officer of Health, Trenton, Pictou County, N.S.
Dr. F. T. Underhill, retired Medical Officer of Health for the City of Vancouver, B.C.

The Committee is indebted to several members for interesting records, including programs of Association meetings, newspaper clippings, and photographs. From the material received a detailed historical account is being compiled. For the purposes of the Association, the Committee has prepared the following brief abstract of the essential facts in regard to the founding of the Association and its subsequent history.

HISTORY OF THE CANADIAN PUBLIC HEALTH ASSOCIATION

(Abstract from the Compilation being made by the Committee)

The first association of medical officers of health was effected in Ontario in 1886 following the first public health congress held in Canada, the annual meeting of the American Public Health Association. It was at this meeting that the constitution of the American association was enlarged to include Canadian members. Within a few years, however, the Ontario association of health officers was discontinued and it was not until 1912 that specific provision was made in the revision of the Public Health Act for its permanent establishment. The growing sense of need for mutual assistance and co-operation, interprovincial and national, led to the formation in 1900 of the Canadian Association for the Prevention of Tuberculosis. The need, however, for a national association in the broad field of public health was still more accentuated when in Ottawa, 1910, at the call of the Commission of Conservation of Canada, a conference of federal and provincial public health officers was held and formally organized for future work.

During this conference, through the efforts of the editors of the "Public Health Journal", then published privately in Toronto, those attending the conference and others met and, after discussion, agreed on the desirability of establishing a Canadian public health association, adopting the Journal as their organ, subject to their official supervision. Among those attending this meeting were Dr. E. P. Lachapelle, President of the Superior Board of Health, Quebec; Dr. E. Montizambert, Ottawa; Dr. C. J. Fagan, Provincial Medical Officer, Victoria; Dr. M. M. Seymour, Commissioner of Health, Saskatchewan; Dr. J. W. S. McCullough, Chief Health Officer, Ontario; Dr. Charles A. Hodgetts, Medical Adviser, Commission on Conservation, Ottawa; Dr. Peter H. Bryce, Chief Medical Officer, Department of the Interior, Ottawa; Dr. George D. Porter, General Secretary, Canadian Anti-Tuberculosis Association,

Toronto; Sir James Grant, Ottawa; Dr. E. B. Fisher, Fredericton; Dr. Duncan M. Anderson, Toronto; and Mr. E. M. Wood, Winnipeg.

Ontario Letters Patent were issued to the Association on September 22, 1910. The five original incorporators were Dr. D. M. Anderson, Dr. A. J. Harrington, Dr. C. J. Hastings, Mr. T. Aird Murray, C.E., and Dr. L. McD. Coulter. The first public meeting of the Association was held in the Parliament Buildings, Ottawa, in November, 1910. At this meeting Dr. T. A. Starkey of McGill University was formally elected President; Major Lorne Drum, Ottawa, General Secretary; and Dr. George D. Porter, Toronto, Treasurer. The Public Health Journal was made the official organ.

The first annual congress was held at McGill University, December 13-15, 1911, under the presidency of Dr. T. A. Starkey. The Govenor-General of Canada, the Duke of Connaught, and Lord Strathcona, the Honourable R. L. Borden, and the premiers of all the provinces, together with their ministers in charge of public health services, gave their support. Among the many public health leaders contributing to the program were Dr. C. J. Fagan, Dr. J. D. Pagé, Dr. Peter M. Bryce, Dr. H. W. Hill, Dr. Wm. Oldright, Dr. M. M. Seymour, Dr. John A. Amyot, Dr. Helen MacMurchy, Dr. Charles A. Hodgetts, Dr. C. J. Hastings, Dr. James Roberts, Mr. T. Aird Murray, and Dr. G. G. Naismith.

The second annual congress of the Association took place at the University of Toronto in September, 1912. A Dominion charter had been granted to the Association in April of that year and was presented at this congress. Dr. Charles A. Hodgetts was the first President under the Dominion charter and took an active part in the development of the Association. The charter members were: Dr. Maurice Macdonald Seymour, Dr. G. Macdonald, Dr. T. H. Whitelaw, Dr. A. J. Douglas, Dr. L. Laberge, Dr. W. J. McKay, Sir W. C. Van Horne, K.C.M.G., Dr. James Warburton, Dr. Henry D. Johnson, Dr. Chas. A. Hodgetts, Dr. T. A. Starkey, Major Lorne Drum, Dr. George D. Porter, Dr. E. P. Lachapelle, Dr. J. D. Pagé, Dr. J. G. Rutherford, Dr. A. J. Harrington, T. Aird Murray, Esq., C.E., Dr. W. T. Connell, Dr. John W. S. McCullough, Dr. Grace Ritchie-England, Dr. Chas. H. Higgins, W. D. Lighthall, Esq., K.C., Miss Ethel Hurlbatt, M.A., Dr. Peter H. Bryce, Dr. E. Montizambert, Sir I. A. Grant, K.C.M.G., Col. G. Carleton Jones, M.D., Dr. Chas. J. Hastings, Dr. R. M. Simpson, Dr. Smith L. Walker, Dr. E. O. Steeves, P. B. Tustin, Esq., M.R.San.I.; The Hon. G. W. Murray, Premier of Nova Scotia; Mrs. N. C. Smillie, Dr. A. E. Webster, Dr. C. V. Valin, Dr. Helen MacMurchy, Dr. George G. Melvin, and Clifford Sifton, Esq.

The Association therefore was incorporated in 1910, with Dominion incorporation in 1912, and is now in the twenty-fifth year of its work. The following annual meetings have been held:

Montreal, December 13-15, 1911; President, Dr. T. A. Starkey.
Toronto, September 16-18, 1912; President, Dr. Chas. A. Hodgetts.
Regina, September 18-20, 1913; President, Dr. J. W. S. McCullough.
No meeting in 1914.
Toronto, September 3 and 4, 1915; President, Dr. M. M. Seymour.

Quebec, September 13 and 14, 1916; President, Dr. C. J. Hastings.
Ottawa, September 27 and 28, 1917; President, Dr. J. D. Pagé.
Hamilton, May 27-June 1, 1918; President, Dr. W. H. Hattie.
Toronto, May 26-28, 1919; President, Dr. J. A. Hutchinson.
Vancouver, June 21-23, 1920; President, Dr. H. E. Young.
Toronto, May 16-18, 1921; President, Dr. John A. Amyot.
Saint John, June 6-9, 1922; President, The Hon. Wm. F. Roberts, M.D.
Edmonton, June 12-14, 1923; President, Dr. J. A. Baudouin.
No meeting in 1924.
Montreal, June 8 and 9, 1925; President, Dr. J. A. Baudouin.
Toronto, May 5-7, 1926; President, Dr. George D. Porter.
Toronto, June 14-16, 1927; President, Dr. George D. Porter.
Winnipeg, October 11-13, 1928; President, Dr. George D. Porter.
Montreal, June 18-20, 1929; President, Dr. N. MacL. Harris.
Toronto, May 19-21, 1930; President, Dr. A. J. Douglas.
Regina, June 17-19, 1931; President, Dr. F. C. Middleton.
Toronto, May 25-27, 1932; President, Dr. W. J. Bell.
Saint John, June 19-21, 1933; President, Dr. Wm. Warwick.
Montreal, June 11-13, 1934; President, Dr. Alphonse Lessard.
Toronto, June 3-5, 1935; President, Dr. F. W. Jackson.
Vancouver, June 22-27, 1936; President, Dr. J. W. McIntosh.

The JOURNAL has been published continuously for twenty-six years, first appearing in January, 1910, some months prior to the incorporation of the Canadian Public Health Association. Although the official organ of the Association, it was privately owned and published as the "Public Health Journal" under the editorship of Dr. Duncan Anderson, with Dr. Lester McD. Coulter, operating as the York Publishing Company.

For several years the company met with success in its efforts, but shortly after the commencement of the war such difficulties were encountered that it appeared unlikely that the publication of the JOURNAL could be continued. At this juncture a group of members of the Association who attended the annual meeting held in Ottawa in 1917 undertook to continue the JOURNAL in order to hold it for the Association. These members included Doctors J. G. FitzGerald, Alan Brown, George E. Smith, James Morton, E. J. Trow, George D. Porter, and Gordon Bates. To carry on the JOURNAL required the continuation of the York Publishing Company and the assumption of considerable financial obligations. In 1920 the Executive Council of the Association assumed a share in the responsibilities of the JOURNAL by acquiring a block of shares in the York Publishing Company. Again on this occasion a number of the Association's members contributed generously to make this possible.

During the four years 1925-1928 efforts were made by the Executive Committee to formulate plans for acquiring the JOURNAL. As a result, in 1928 the responsibility for the publication of the JOURNAL was assumed jointly by the Association and the York Publishing Company and an option to purchase the JOURNAL was granted to the Association by the owners on the most favourable terms. The annual meeting in Winnipeg in October, 1928, endorsed the purchase and arrangements were completed whereby the JOURNAL became the property of the Association at the end of the year. Editorial responsibility was

left with the Editorial Board that had been appointed in 1928 and the Executive Committee was charged with the business management. Commencing its twentieth volume with the January, 1929, issue, the JOURNAL assumed the name CANADIAN PUBLIC HEALTH JOURNAL, as expressive of its distinctly Canadian character. It is indeed gratifying to those members of the Association who maintained the JOURNAL during many trying years to know that their efforts were not in vain and that, as the Association's property, the JOURNAL has achieved an outstanding position as a scientific publication reflecting the progress of public health and preventive medicine in Canada.

In the Constitution of the Association provision was made for the organization of sections devoted to special fields of public health. The earliest section to be organized was that formed by those interested in laboratory work, in 1917. Sections of Social Hygiene and Mental Hygiene were organized in 1918. Following a conference called by the Canadian Red Cross Society in 1920 for the consideration by the Red Cross of the peace-time program as relating to public health, a grant of $5,000 was made to the Association for the furtherance of the work of the Section of Child Welfare, which had been formed in 1917. Miss E. M. Forsythe was appointed secretary of the Section and the preparation of suitable literature including diet folders and posters and of a moving picture film, "Betty's Welfare", was undertaken. With the establishment of the Canadian Council on Child and Family Welfare in 1921, undertaking work in the whole field of child welfare, the Section decided in 1922 to confine its activity specifically to child hygiene, at the same time leaving the preparation of literature, etc., to the new organization. A Section of Industrial Hygiene was added in 1925, Public Health Nursing in 1926, Vital Statistics in 1929, Public Health Engineering in 1931, and Public Health Education in 1935.

G. D. PORTER, *Chairman*; J. W. S. MCCULLOUGH, and J. D. PAGÉ.

REPORT OF THE COMMITTEE ON HONORARY LIFE MEMBERSHIP

THE Committee has the honour to present the names of Dr. Walter H. Brown, Palo Alto, Cal.; Dr. A. J. Chesley, St. Paul, Minn.; Dr. J. W. S. McCullough, Toronto; and Mr. E. S. Macphail, Ottawa, as recipients of honorary life membership.

Dr. A. J. Chesley, Executive Officer of the State Board of Health of Minnesota, is known throughout the continent as one of the outstanding administrative officers in public health. The Association is honoured in having the privilege of conferring honorary life membership on Dr. Chesley as Executive Secretary of the State and Provincial Health Authorities of North America as well as a token of the appreciation of his many contributions to public health. It is fitting indeed also that the Association should mark on this occasion the first joint meeting with the American Public Health Association, Western

Branch, by conferring honorary life membership on the President of the American Public Health Association, Dr. Walter H. Brown. Dr. Brown, Professor of Hygiene in Leland Stanford University, has had a distinguished career in public health, having served as a member of the Commission for the Prevention of Tuberculosis in France appointed by the Rockefeller Foundation at the close of the war, and in important administrative offices in the United States.

Two of the Association's distinguished members, Dr. J. W. S. McCullough, Toronto, and Mr. E. S. Macphail, Ottawa, will be honoured by the Association this year. As one of the charter members of the Association, Dr. McCullough has followed with keen interest the development of the Association during its twenty-five years of history, having served as President in 1913 and as a member of the Executive Committee for many years. Mr. E. S. Macphail, Chief of the Division of Demography in the Dominion Bureau of Statistics until his retirement last year, is known to all administrative officers for his achievements in establishing vital statistics on a national basis and for his support which made possible the formation of the Section of Vital Statistics in the Association.

The presentation of honorary life memberships will be made at the annual meeting.

J. T. PHAIR, *Secretary, Executive Committee.*

THIRD ANNUAL REPORT OF THE COMMITTEE ON THE CERTIFICATION OF SANITARY INSPECTORS

IN presenting the third annual report of the Committee, it is a pleasure to record the excellent co-operation which has been extended by the Provincial Medical Officers of Health, the Department of Pensions and National Health, and the Canadian Institute of Sanitary Inspectors. The Committee is grateful also for the leadership of certain municipal departments of health, including the departments of health of Toronto, Winnipeg, Windsor, and Vancouver, in arranging courses of instruction for inspectors of their departments.

With the approval of the plans of the Committee for the conduct of examinations, including the regulations for registration and the syllabus, the Committee selected December 11, 12 and 13, 1935, as suitable dates for the first examinations. Posters announcing the examinations were sent to the medical officers of health of the larger municipalities, and copies of the syllabus, together with a list of recommended text and reference books and other publications, were forwarded for distribution. As this distribution was not possible until the early fall, a period of only three months intervened between the general announcement and the holding of the examinations. There was, of course, also a natural hesitancy on the part of a number of candidates who made enquiries

in regard to the examinations, not being able to judge of their training in the light of the standard of the examinations.

The examinations were held in three provincial centres; namely, Vancouver, Toronto, and Halifax. Provision is made in the regulations for the granting until December 31, 1937, of the certificate of the Association without examination to holders of the certificate of the Royal Sanitary Institute or other qualification acceptable to the Board. In all, ten candidates received the certificate, five of whom qualified without examination.

The examinations are designed to permit the certifying of suitable inspectors for general work who are qualified by experience and have acquired an adequate knowledge of the subjects which are fundamental in the proper conduct of their work. To this end the examinations require the preparation of a report of a field investigation conducted at the time of the examination; an interview constituting an oral examination by the Provincial Board of Examiners, which consists of the chairman, a sanitary inspector, and, if possible, a sanitary engineer; and three written papers. In this way the candidate has an ample opportunity to present evidence of his fitness for the certificate.

In view of the interest attaching to the holding of the first examinations, the 1935 examination papers are presented.

FOOD CONTROL AND LEGISLATION

Time: 3 hours

1. Describe the features to be noted in the inspection of a milk pasteurization plant and indicate the importance of each in rendering milk safe for human consumption.
2. (*a*) To what points would you direct your attention in the inspection of a bake-shop?
   (*b*) In what ways may food cause illness? Illustrate your answer by examples.
3. Write notes on:
   (*a*) Safe dish-washing in a restaurant.
   (*b*) Composition of cow's milk.
   (*c*) Essentials of a "milk house."
   (*d*) Bottle-washing in a soft drink plant.
4. (*a*) What are the essentials of a satisfactory slaughter house?
   (*b*) What are the characteristic features of sound beef?
   (*c*) What action would you take on finding a portion of unsound or diseased meat in a retail store?
5. Under what enactments does the sanitary inspector carry out his duties in the province in which you reside?

PREVENTION AND CONTROL OF COMMUNICABLE DISEASES AND RELATED SUBJECTS

Time: 3 hours

1. (*a*) How are communicable diseases commonly spread? Illustrate your answer by examples.
   (*b*) By what means may the incidence of smallpox, typhoid fever, and tuberculosis be most effectively reduced in any large community?
2. Why has complete control of communicable disease not been accomplished through

isolation and quarantine? Discuss the part to be played by the sanitary inspector in the control of communicable diseases.

3. Explain the following terms as they apply to smallpox:
   (*a*) Notification.
   (*b*) Isolation.
   (*c*) Quarantine.
   (*d*) Terminal disinfection.
4. (*a*) Describe briefly the life history of the house fly.
   (*b*) Outline the methods of control.
   (*c*) What diseases may be spread by the house fly?
5. Write notes on:
   (*a*) Control of bed bugs.
   (*b*) Crude death rate.
   (*c*) Droplet infection.
   (*d*) Diphtheria toxoid.
   (*e*) Carriers.

SANITATION

Time: 3 hours

1. Describe the sanitary facilities, including a safe water supply, which should be supplied for:
   (*a*) A farm house.
   (*b*) A lumber camp of 100 men.
   (*c*) A rural school.
2. What, in your opinion, constitutes the important features of good housing? Enumerate the items to which you would pay special attention in making an inspection of a lodging house.
3. Outline the plumbing and drainage system of a dwelling, installed in accordance with local by-laws, illustrating with a sketch showing:
   (*a*) Laundry tub in the cellar.
   (*b*) Sink on the ground floor.
   (*c*) Water-closet, bath, and wash-basin on the second floor.
4. How would you proceed to make a sanitary survey of a municipality and what information would you secure? Describe how this information could be presented intelligently to the officials of the municipality.
5. What are the constituents of refuse from a city? Describe the methods which may be employed in the disposal of refuse, mentioning advantages and disadvantages of each method.

The duties of the Central Board of Registration and Examination include the preparation and reading of the written papers. Each Provincial Examining Board forwards the marks given for the field report and for the oral examination. In the granting of the certificate without examination, the certificate is awarded on the recommendation of the Provincial Examining Board after a proper enquiry.

REPORT OF CENTRAL BOARD MEETING

On February 15, 1936, the Central Board met in Toronto. Those in attendance were: Dr. J. G. Cunningham, Toronto (Chairman); Dr. J. A. Baudouin, Montreal; Dr. R. St. J. Macdonald, Montreal; Dr. R. D. Defries, Toronto; Mr. Percy Pickering, Winnipeg; Mr. A. S. O'Hara, Sioux Lookout, Ont.; and

Dr. J. T. Phair, Toronto (Secretary). The reports of the examinations were considered and the following candidates were recommended to receive the certificate by examination: Mr. Stanley Fairhurst, Provincial Board of Health, Victoria, B.C.; Mr. Thomas Henry Jackson, Department of Public Health, Toronto; Mr. Alexander Williams McDonald, Department of Public Health, Toronto; Mr. Arthur C. Pettipas, City Health Board, Halifax, N.S.; and Mr. Jacob Edward Weis, Board of Health, Stratford, Ont. In addition, the following holders of the certificate of the Royal Sanitary Institute or other acceptable qualification were granted certification without examination: Mr. Arthur Dicaire, Bureau of Health, Lachine, Que.; Mr. Hugh Jamieson, City Health Department, Swift Current, Sask.; Mr. Alexander McCulloch, Building Department, Vancouver, B.C.; Mr. Alexander Stuart O'Hara, Provincial Department of Health, Sioux Lookout, Ont.; and Mr. Edgar Gilbert Southon, Provincial Department of Health, Swift Current, Sask.

The Central Board considered carefully the regulations in the light of the experience gained in actual trial, the conduct of the examinations, and the form of the certificate. A sub-committee consisting of Dr. R. D. Defries and Mr. A. S. O'Hara was appointed to consider the preparation of a manual of instruction.

The findings of the Central Board were duly communicated to the members of the National Committee and, having been approved, are herewith submitted to the annual meeting for endorsation:

1. That the regulation relating to the granting of the certificate without examination to holders of the certificate of the Royal Sanitary Institute, the Royal Sanitary Association of Scotland, or the Royal Sanitary Institute and Sanitary Inspectors Examination Joint Board be amended to require that applications for certification without examination must be received prior to January 1, 1938.

2. That the regulation relating to fees be amended to provide for a fee of five dollars for candidates receiving the certificate without examination.

3. That the following form of the certificate be approved:

CANADIAN PUBLIC HEALTH ASSOCIATION
(Incorporated 1910)

This is to certify that

.....

has fulfilled all the requirements and is hereby granted the
Certificate in Sanitary Inspection

In witness whereof we have hereunto subscribed our names and affixed the seal of the Association this ..... day of 19

.....
President

.....
General Secretary

Seal

.....
President, Canadian Institute of Sanitary Inspectors

The limitation of the period for the granting of the certificate without examination, namely to January 1, 1938, permits of the reconsideration of the question at that time in the light of the experience. The interest of the sanitary

inspectors who already held an approved certificate is appreciated by the National Committee as tangible evidence of the desire of those holding such certificates in Canada to establish the new Canadian certificate.

Announcement has already been made of the dates of the next annual examination, namely September 23rd, 24th, and 25th. It is anticipated that a large group of inspectors will sit for the examination and arrangements have been completed for the establishing of Provincial Examining Boards in each of the provinces. It is the hope of the Committee that the income from fees will be sufficient to meet the cost of the conduct of the examinations and certificate, including the holding of an annual meeting of the Central Board.

J. T. PHAIR, *Secretary.* J. G. CUNNINGHAM, *Chairman.*

THIRD ANNUAL REPORT OF THE COMMITTEE ON THE ANNUAL REPORT OF THE MEDICAL OFFICER OF HEALTH

THE committee of the Association, which is representative of the leading municipal departments of health throughout Canada, is pleased to report definite progress in its objective of making the annual report of the medical officer of health of greater value both to the department and to the members of the community.

In presenting this matter to medical officers of health of the cities and towns of Canada, the committee again pointed out the purpose of an annual report; namely:

(1) To indicate what has been accomplished during the year.
(2) To direct attention to urgent health work which needs to be done, indicating how this may be accomplished by extensions of services, passing of regulations, etc.
(3) To show how the money appropriated has been expended in advancing the health of the community.
(4) The preparation of the report with a definite objective of fostering an intelligent and active interest on the part of the public through the publication of the report in the press and its distribution to interested citizens.

No part of the report is of greater importance than the statement by the medical officer of health outlining not only what has been accomplished but what remains to be done and suggesting how the necessary work may be undertaken.

An essential part also is a budget. It is regretted that in so many municipalities the health officer prepares no budget but submits his accounts as incurred. Such a plan is inadequate and gives the health officer no opportunity to proceed with essential work which he often realizes should be undertaken but hesitates to commence. A budget would give the opportunity for the discussion of such matters.

Last year the committee devoted itself primarily to the consideration of the best form for the presentation of vital statistics. It was felt that health officers did not utilize vital statistics and as a result failed frequently to appre-

ciate the presence of urgent problems in their community and in consequence did not undertake any control program. It was felt that if suitable tables could be prepared and the essential vital statistics properly presented, the health officer would have before him a picture of the situation, particularly as the tables provided for the inclusion of relative data for the preceding period of five years. The following reference is made to the form of the vital statistics report:

The essential data are presented in twelve tables for the use of municipalities of 10,000 population and over. It was realized by the committee that the report form should be modified for smaller municipalities and the committee have such a form under consideration. It is hoped that this form for the use of smaller municipalities may be made available for general use for the year 1936-37.

Data concerning live births, stillbirths, marriages, and crude mortality are presented in the first three tables. Throughout the report the importance of clearly separating the statistics of residents and non-residents has been recognized. Data for the preceding four years are included in each of these tables. The Abridged International List (43 titles), as provided in these tables, has proved very helpful and has been utilized by all the municipalities in the reports received.

Following the thought of having the health officer visualize the problems from the statistical returns, the major causes of death are set forth in table IV in such important groups as diseases of heart, arteries and kidneys, including apoplexy; cancer, all forms; tuberculosis, all forms, etc., with the rates for two preceding years.

Infant mortality and maternal mortality are subjects of prime importance. The essential data are presented in tables V, VI, VII, and VIII; in each case grouping the major causes of death, with due consideration to deaths of residents and non-residents. Appreciation of this effort to indicate the major problems to the health officer by the analysis of his statistical data has been expressed by a number of officers.

Communicable diseases are an important responsibility of the health officer. Not only does the report present in convenient form the reported cases and deaths by age-groups but for the first time makes it possible to obtain a clear statement as to the extent of various immunization procedures such as diphtheria and scarlet fever immunization and vaccination against smallpox. Further, in the instance of scarlet fever, diphtheria, whooping cough, measles, and typhoid fever a table presents comparative data for two preceding years for cases and deaths, again making it possible for the health officer to prepare his report having before him the problems presented by these five diseases.

Finally, separate provision is made for the consideration of tuberculosis. In the past, comparison between municipalities was not possible because of the failure to include deaths of citizens in sanatoria outside of the municipality. The special table provided facilitates such comparison and clearly presents the problem of tuberculosis as reflected in the number of deaths in the municipality.

In submitting the forms this year the committee felt that medical officers

of health serving in a part-time capacity might consider that the forms requested too much information and that they had not the necessary facilities and time. The response, however, has been most gratifying and expressions of general appreciation have been received. No suggestions have been made for changes in the form and this is considered an evidence of its practical character.

As previously mentioned, it is the hope of the committee that an intensive study may be made of health budgets and that, through the co-operation of the medical officers of health of the various cities, a plan for a health budget may be adopted which will clearly define the activities which may properly be considered activities of the department of health. From such a budget it will be possible for the medical officer of health of one municipality to obtain valuable information concerning the expenditures of another municipality for similar work.

Last year the committee recommended that annual reports of health officers should cover the calendar year. This was not possible in Ontario without an amendment to the Public Health Act. The recommendation of the committee was approved by the Department of Health of Ontario and provision duly made for an amendment to the Act. As a result, almost all the municipalities in Canada will now present their annual reports for the calendar year.

The report forms were adopted for use in Ontario and forwarded, through the Department, to the various municipalities for their use. In reporting on the results of the use of the forms, the Department stated:

> "Generally speaking the various divisions and the Department as a whole feel that the standard form has made a very real contribution to the study of health administration in Ontario. A great deal of education has been an incidental result in bringing to the attention of the local health authorities the necessity for recording definite items in regard to activities and statistical matters in their routine work. From the reports information can be easily obtained which permits of the comparison of any group of municipalities in regard to a particular health activity."

MISS MARY POWER, *Secretary.* D. V. CURREY, *Chairman.*

REPORT OF THE COMMITTEE ON THE REMUNERATION AND DUTIES OF THE MEDICAL OFFICER OF HEALTH

REALIZING that a practical approach to this subject would lie in a detailed study as relating to one province, the Committee undertook to limit its initial investigation to the province of Ontario. The Committee is proceeding with the drafting of recommendations in regard to remuneration on the basis mentioned in the report. It is hoped that publication of this report will result in constructive criticism and that, if the Association so desires, the Committee may widen its study to include other provinces. Taking into consideration the present public health legislation as it exists in Ontario, the Committee considered the status of the part-time rural medical officer of health, defining his reasonable activities in public health. The Committee held three formal meetings in Hamilton and Kitchener.

REMUNERATION

It was agreed that section 38 of the Public Health Act, which requires that a reasonable *salary* should be paid, should be strictly adhered to. It was agreed also that the practice of a retaining fee appointment, where the medical officer of health was paid a nominal salary and paid on the fee basis for other public health work, should be discontinued.

It is recommended that within certain geographical limitations, total remuneration should be arrived at on the basis of a certain amount per one hundred of population in the municipality.

DUTIES

The Public Health Act was considered from the standpoint of what should be undertaken as regular duties of the medical officer of health.

Statutory Meetings

The responsibility for convening the local board of health at least four times during the year should rest with the medical officer of health. Other meetings could be called at any time by other members of the board but the rural health officer should take the initiative in calling the statutory meetings.

Annual Sanitary Inspection of Schools

This is a statutory duty laid upon the medical officer of health by section 31, subsection 3, of the Public Health Act. This Committee suggests that a definite outline should be drawn up as to what the medical officer of health should be expected to examine and report on to the Department. Such matters as proper lighting, washing facilities, water supply and sanitary conveniences, should receive attention by the medical officer of health in his inspection; and definite recommendations should be made to the school board for correction of defects that the medical officer of health deems necessary.

Medical Care of Indigents

The medical officer of health has no responsibility to undertake this work unless an agreement has been made with him by the corporation of the municipality.

Communicable Diseases

Duties with respect to communicable disease control are outlined in sections 53 to 72 of the Public Health Act. The health officer has certain set responsibilities in this regard:

(a) The health officer should report at least once a week all cases of communicable disease which have been reported to him to the secretary of the local board of health. The statutory return from each municipality as required by section 22 of the Act, is made by the secretary of the board, and to have this return complete it is absolutely necessary that the medical officer of health report these cases to the secretary.

(b) The responsibility for the diagnosis of communicable disease rests

with the medical officer of health. Although the health officer may accept the diagnosis of a fellow practitioner, he must realize that the responsibility for such diagnosis rests with him.

(c) Although it is not made statutory, it was recommended that the medical officer of health should keep on hand a small quantity of tetanus antitoxin and diphtheria antitoxin for emergency purposes and for the convenience of his fellow practitioners.

(d) The release from quarantine is solely the responsibility of the medical officer of health.

(e) With respect to the accepted forms of immunization, it was recommended that vaccination against smallpox should be provided by the medical officer of health for all indigents or to any who were recommended for vaccination by their private practitioner. It was also recommended that this should apply to the administration of diphtheria toxoid and scarlet fever toxin, and that typhoid inoculation should be administered on request.

(f) Any removal or transfer of a patient suffering from or contacts of communicable disease to another municipality should be made only under the direct order of the medical officer of health, and due notice should be given to the medical officer of health of the municipality to which it is proposed to have such case or contact removed.

(g) The control of tuberculosis and the making available of facilities for the examination of family contacts were considered a responsibility of the health officer. It was pointed out that assistance in this type of work should be requested from the Division of Tuberculosis Prevention.

Nuisances

The medical officer of health is required, under sections 73 to 104, to undertake certain duties with respect to nuisances, lodging houses, laundry houses, dairies, cheese factories, dairy farms, bakeries, butcher shops, ice supplies, and slaughter houses.

Milk Supply

It was recommended that the premises from which milk is sold should be inspected at least once a year either by the medical officer of health or by his sanitary inspector.

It was recommended also that any regulations which may be brought down by the Milk Control Board for the inspection of dairies, cheese factories, etc., should receive the full co-operation of the medical officer of health if such be requested.

Inspection of Tourist Camps, etc.

The inspection of slaughter houses, butcher shops, summer camps and tourist camps should be made regularly either by the medical officer of health or by his sanitary inspector. To assist the medical officer in these inspections, it is recommended that forms be supplied by the Department indicating the various points which should receive particular attention.

Examination of Water Supply

The health officer has a fixed responsibility for taking of samples of water, either when so requested by the householder or in the epidemiological investigation of a source of infection of water-borne disease. In schools, public buildings and summer camps within the municipality, regular analyses should be made and the responsibility of forwarding these samples would rest with the medical officer of health. The taking of such samples could be delegated to the sanitary inspector or other officer.

Recreational Facilities, Tourist Camps, Bathing Beaches, etc.

Where the medical officer of health has reason to believe or upon investigation has found that certain bodies of water within the municipality are unsafe for bathing purposes, he is obligated to post notices warning the public that such bodies of water are unfit for bathing. In the case of public beaches, proper toilet facilities should be provided and regularly inspected by an officer of the local board of health.

Discontinuance of Water Supply

In the case of the water supply being discontinued for non-payment of water rates in premises where there are inside sanitary conveniences, the medical officer of health has a responsibility in seeing that such service be re-established in order to prevent the creation of a nuisance within the meaning of the Public Health Act.

Maternity Boarding Houses

Certain responsibilities are laid upon the medical officer of health under the Maternity Boarding House Act. The medical officer of health is required to keep a register for any applying under this Act, as is also the operator of boarding houses, and he is also required to make an inspection, limiting the number of women, girls or infants who may be received into such house, and also pass upon the ability of the maternity boarding house keeper properly to keep and lodge such women and children. Inspection is required to be made "from time to time".

Secrecy is required of the medical officer of health respecting information which comes to him through this register.

Venereal Diseases Prevention Act

The medical officer of health has a fixed responsibility in arranging for the necessary treatment of any patient who has been reported to him as suffering from venereal disease and who is unable to pay for such treatment. The administration of the Act is under his jurisdiction and all notices and orders required under the Act must be served by him. The expenses connected with the treatment of such indigents are borne by the municipality and refunded in part by the Department.

J. E. DAVEY, *Chairman;* WARD WOOLNER, J. W. FRASER, J. T. PHAIR, and A. L. MCKAY, *Secretary.*

LETTER FROM GREAT BRITAIN

GEORGE F. BUCHAN, M.D., F.R.C.P., D.P.H.
London

Midwives

The Right Honourable Sir Kingsley Wood, M.P., Minister of Health, is making a determined effort to reduce the puerperal mortality rate of 4.13 per thousand total live and still births during the past five years in this country. At the present moment he is dealing with the problem of the practice of midwives and it would appear that before long whole-time salaried midwives will generally be employed in this country. Perhaps the genesis of this position would be interesting to my Canadian colleagues.

The First Midwives Act

Charles Dickens, who depicted the more or less mythical character of Sarah Gamp, may perhaps be considered one of the pioneers of the reform of the practice of midwives. In any case the first Midwives Act was passed in this country in 1902 with the ultimate object of preventing any person habitually and for gain attending women in childbirth unless such person were a certified midwife. This Act set up the Central Midwives Board as the authority in this country for regulating the courses of training and the examinations for midwives. It is also the authority which lays down the rules under which midwives may practise and ultimately it is a court before which midwives may be brought for failure to observe the rules of the Board.

The Board itself does not employ officers to inspect the work of practising midwives but such officers are employed by the local supervising authorities who are required to see that the rules of the Board are carried out by the midwives. These rules have been modified by the Board from time to time and at present the rules as regards training are under extensive revision. It is probable that within a very short time there will be few practising midwives in this country who are not fully qualified nurses with an extended training in midwifery. No doubt some will be allowed to become certified midwives who are not trained nurses but it is not probable that many who adopt this method of entry to a midwifery career will be favoured in practice.

The Present Midwives Bill

This Bill which was introduced into Parliament by the Minister of Health on the 18th March, 1936, has for its main purpose the improvement of the standard of domiciliary midwifery in England and Wales by the establishment of an adequate service of salaried midwives. The Bill has really come into being on account of the Report of the Joint Council of Midwifery which was issued in 1935. The Joint Council of Midwifery was formed at the instance of the National Birthday Trust Fund in January, 1934, under the chairmanship of the Earl of Athlone, and subsequently appointed from its members a Midwifery Services Committee under the chairmanship of Dr. Watts Eden to enquire into the whole question of the status and remuneration of midwives as bearing on the efficiency of the midwifery service—a well-trained, well-informed and intelligent service of midwives working in co-operation with the medical profession being of premier importance in any scheme for the reduction of maternal mortality and morbidity.

After an exhaustive survey of present conditions and various alternative proposals for dealing with this difficult problem the Committee con-

cluded that normal confinements can be satisfactorily conducted in the patient's own home except when this is unsuitable, that the nursing of every maternity case should be conducted by a qualified midwife, that unqualified persons should not be permitted to nurse maternity cases for gain and that there is no satisfactory alternative to the introduction of a municipal salaried whole-time midwives' service in all areas not already adequately served by salaried midwives.

The Committee outlined a scheme for the establishment of such a service and gave special consideration to the problem of the relation between voluntary organizations providing midwifery services and the proposed municipal service.

The Committee further expressed the opinion that it should be the duty of the local authority to provide or secure the provision of an adequate domiciliary service of midwives in its area and for this purpose should employ the requisite number of whole-time midwives at adequate salaries or aid approved voluntary organizations that employ salaried midwives for service in its area.

Since one of the principal objects of the scheme is to attract a better type of candidate to the profession and eventually to ensure a higher degree of proficiency, the Committee considered it essential that the status and remuneration of midwives should be raised and recommended that midwives entering the municipal service should receive adequate pay and allowances and pension rights.

The average number of cases that a midwife would be expected to attend in urban areas should not exceed 80 per annum in view of the increased work falling upon midwives as a result of recent developments of midwifery practice and the increased amount of ante-natal attention now required. This figure would be less for scattered districts.

Compensation for existing midwives not accepted for appointment to the municipal service and pensions for aged and infirm midwives are recommended in order that the efficiency of the service may be maintained.

The Committee further recommended that every midwife should be required to take a refresher course at intervals not exceeding seven years.

These were the main findings of this important Committee and practically they have all been included in the Midwives Bill 1936, now before Parliament.

The Minister of Health proposes to give a grant to local authorities equal to 50 per cent of the net cost of the scheme to them and it is estimated in the explanatory memorandum to the Bill that this amount will be in the region of £500,000 per annum for England and Wales.

It would appear likely that this Bill will shortly receive the Royal Assent.

NURSERY NURSES

Although perhaps this subject has only a remote relationship to the question of childbirth, a recent development in connection with the training of nursery nurses is perhaps worthy of note.

A few years ago the Royal Sanitary Institute was asked by the Association of Nursery Training Colleges to co-operate in the establishment of a national certificate for nursery nurses. A joint committee was appointed and a scheme drawn up whereby a Nursery Nurse's Certificate was only awarded to candidates who passed the recognized examination of the Royal Sanitary Institute. Candidates for this Certificate are required to produce satisfactory evidence of having passed the examination qualifying for the certificate of training at a nursery training college affiliated to or recognized by the Association of Nursery Training Colleges. The syllabus of subjects includes a brief outline of the general structure and functions of the body; personal hygiene; surroundings; food; water; clothing; the physical

development of the child; the mental development of the child; indications of ill health; the prevention of communicable disease, and first aid.

Higher examinations are held for certificates of advanced child study in psychology and also in nutrition. Candidates are not allowed to enter for these certificates until the expiration of at least six months after having passed the examination for the nursery nurse's certificate.

The establishment of these national certificates for nursery nurses assures the right care and upbringing for the rising generation both in private homes and also in institutions and nursery schools which are being opened in this country in increasing numbers.

PLANS, PROGRAMS, AND PROGRESS

PROGRESS IN TUBERCULOSIS CONTROL IN BRITISH COLUMBIA

THE publication of the report of the Tuberculosis Division under the direction of Dr. W. H. Hatfield, in the Bulletin of the British Columbia Board of Health, is of great interest, presenting as it does the provincial program with the results of the actual workings of the program as observed during the seven months since its inception. Detailed reports are included of the Vancouver unit, the Tranquille Sanatorium, the Vancouver Island unit under the direction of Dr. Frederick Kincaid, the travelling clinic covering the interior of the province and conducted by Dr. G. F. Kincade, and a similar service in the lower mainland directed by Dr. A. S. Lamb.

A summary of the progress is presented in tabular form in this report as follows, outlining conditions prior to the creation of the division and the steps taken to remedy them.

1. *Sporadic individualistic efforts with no unanimity of opinion:*
   Provincial conference, July 8, 1935, attended by 82 people.
2. *No co-ordination of work:*
   (a) Central administration started.
   (b) Central office erected and furnished.
3. *Inadequate reporting of cases:*
   (a) Report cards made out and distributed to every doctor in British Columbia.
   (b) Free use of mails for these granted by the Dominion Government.
   (c) Every doctor in the province circularized explaining the new organization.
4. *Institutional records of diversified types:*
   All institutional records standardized on international basis.
5. *Overlapping of records and x-rays:*
   Records of each case plus x-ray now travel with patient.
6. *Cases being found too late:*
   (a) Tuberculin testing in schools started; more than 1,200 children tested.
   (b) Parents and doctors circularized about tuberculin testing.
   (c) 200,000 health pamphlets distributed.
   (d) Twenty public health lectures given.
   (e) One radio broadcast on a provincial hook-up.
   (f) Industrial surveys initiated; one completed.
   (g) Literature sent to all public health nurses.
   (h) Exhibits at Vancouver and Victoria exhibitions.
   (i) Travelling exhibit prepared and displayed in 25 locations.
7. *Lack of bed facilities:*
   (a) Forty beds taken over at Jubilee Hospital, Victoria.
   (b) More rapid turnover of present beds started.
   (c) Survey initiated to use beds in small hospitals throughout British Columbia.

(d) A new unit under construction at Vancouver.
(e) Chronic institution urged; report compiled; three places surveyed and of no use.
(f) Treatment centres, six in all, planned to allow cases to return home at earliest possible moment.

8. *Lack of diagnostic facilities:*
(a) Travelling clinic doctor, nurse, x-ray, and car provided for interior. Started September 1, 1935; 745 cases examined to December 31, 1935; 47 new cases of tuberculosis found.
(b) Stationary clinic opened in Victoria, open two days a week; also travelling clinic up Island one week a month. Started September 15, 1935; 484 cases examined to December 31, 1935; 244 known cases of tuberculosis now listed on Vancouver Island.
(c) Dr. Lamb's clinic now concentrating in Lower Mainland and Coast.
(d) Vancouver clinic opened to anyone in British Columbia.

9. *Lack of accommodation in Vancouver clinic:*
Adequate accommodation will be provided in new unit now under construction.

10. *Lack of statistical information:*
A system is being established that will give complete information on all work and all tuberculosis cases dating from January, 1936.

11. *Unsatisfactory admission system:*
Central admitting office established, all beds pooled, cases admitted depending on (a) physical condition, (b) coincidental social problems; 140 applications received in last four months. This is increasing as cases are being rounded up.

12. *Lack of funds for Preventorium work; beds empty.*
Assistance given to the Vancouver Preventorium to permit that institution opening up to full capacity.

13. *After-care problem neglected:*
After-care committee appointed; conference held; four committees appointed study to (a) home nursing, (b) correlation of social agencies, (c) foster homes, (d) Metropolitan Health Board.

14. *No foster-home work:*
Study initiated at after-care conference.

15. *Lack of unanimous opinion with critical discussion needed:*
Central Tuberculosis Council inaugurated, composed of the Director of Tuberculosis Control, the Director of Social Welfare, the Provincial Medical Health Officer, superintendents of institutions, and directors of clinics.

16. *Lack of uniform financing of beds:*
Bed accommodation operating under two acts, the Tranquille and Hospital Acts. Temporary arrangements made with Vancouver and Victoria; suggest Acts made to conform with uniform tuberculosis policy.

17. *Patients' collections at a minimum:*
Central collecting office started and collections from patients materially increased.

18. *School teachers a possible source of infection:*
Request made to the Department of Education that all school teachers be certified tuberculosis-free; also offer made to survey all present teachers in the province.

19. *Independent Christmas seal activities:*
Reorganization started and big step made in Vancouver area.

20. *No vocational work done:*
Voluntary funds raised for a start on this work at the Vancouver unit; forty patients working.

21. *Oriental problem not tackled:*
Two clinics opened in largest Oriental districts, one Chinese, one Japanese. This was done in co-operation with the Vancouver City Health Department—no direct cost to the Provincial Government.

22. *Lack of social service work:*
Start made by correlating work

with Welfare Field Service; one full-time social worker now attached to central office.

23. *Laboratory facilities lacking in Vancouver:*
Up-to-date laboratory built and equipped by the Rotary Club; cost, $2,500.00.

24. *Insufficient follow-up work:*
Plans made for establishing six treatment centres in the more far-flung parts of the province.

25. *Indian problem neglected:*
Several conferences held with representative of the Indian Department. This problem is a responsibility of the Dominion Government.

26. *No research attempted:*
Three fellowships granted by the Vancouver Kinsmen Club; upkeep, equipment, etc., provided by this club.

REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES IN CANADA*
February, March, and April, 1936

Disease	Month	P.E.I.	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Diphtheria	Feb.	..	27	6	80	16	15	12	4	4
	Mar.	1	16	6	53	25	19	16	5	5
	Apr.	..	18	12	66	22	9	10	3	1
Scarlet Fever	Feb.	..	34	9	464	1171	245	74	185	121
	Mar.	1	69	10	461	1248	173	82	195	104
	Apr.	..	57	9	459	1151	239	115	149	85
Measles	Feb.	10	80	86	1079	6472	1843	161	109	445
	Mar.	11	44	21	1188	4368	1866	127	120	594
	Apr.	..	15	165	624	4153	1126	115	59	377
Whooping Cough	Feb.	..	120	180	331	887	75	107	20	157
	Mar.	..	63	43	314	785	58	88	38	146
	Apr.	..	84	49	291	843	20	77	20	177
German Measles	Feb.	..	22	..	4125	3996	95	2465	223	883
	Mar.	11	98	9	5273	9179	685	1938	213	2296
	Apr.	..	107	..	3111	7270	138	1593	299	4214
Mumps	Feb.	2	36	..	378	1703	210	754	95	624
	Mar.	..	12	..	530	2237	218	408	163	612
	Apr.	..	13	5	559	2516	70	299	55	542
Smallpox	Feb.	..	..	..	..	..	..	..	3	..
	Mar.	..	..	..	..	1	..	..	30	1
	Apr.	..	..	..	..	..	..	..	4	..
Cerebrospinal Meningitis	Feb.	..	..	..	4	6	1	..	1	..
	Mar.	..	..	1	4	7	..	1	1	2
	Apr.	..	..	..	3	7	..	..	..	3
Anterior Poliomyelitis	Feb.	..	..	1	..	1	..	..	..	..
	Mar.	..	..	..	4	..	..	1	1	..
	Apr.	..	..	..	1	..	..	..	3	1
Typhoid Fever	Feb.	..	..	6	53	13	11	2	4	4
	Mar.	3	..	5	80	15	15	10	5	3
	Apr.	1	4	1	134	10	17	9	20	4
Trachoma	Feb.	..	..	..	..	..	..	..	..	2
	Mar.	..	..	..	..	..	2	4	..	6
	Apr.	..	..	..	..	..	..	1	..	3

*Data furnished by the Dominion Bureau of Statistics, Ottawa.

BOOKS AND REPORTS

International Clinics. *A quarterly of illustrated clinical lectures and especially prepared original articles. Edited by Louis Hamman, M.D., Visiting Physician, Johns Hopkins Hospital, Baltimore. Volumes III and IV, Forty-fifth series, 1935, and Volume I, Forty-sixth series, 1936. Price, $3.00.*

International Clinics is now entering its forty-sixth series. This fact is testimony to the value of this quarterly to the medical profession. The contributions which are presented are always of a superior character and reflect thought and experience of leaders in medicine and surgery throughout the world. Each volume contains approximately 15 such articles as well as periodic reviews of recent progress in various fields of medical opportunity. An additional new feature has been the supplementary provision of clinical case studies which afford an opportunity for practice in diagnosis based on history, physical findings, and technical facts.

It is possible to draw attention to only a few of the many excellent articles in the three volumes of *International Clinics* which this review covers. In volume III for 1935, "The relationship of allergy to migraine," "Clinical aspects of arterio-sclerotic heart disease," and "Observations on the relation between digestive disturbances and affections of the skin," are noteworthy. Similarly in volume IV for 1935, one might select for specific mention "Anaemia in pregnancy" and "The present status of the treatment of diabetes mellitus." Dr. Long's paper, "Theoretical and practical considerations concerning the use of bacterial vaccines," is a short critical review well worth reading. Of the papers in volume I of the 1936 series, "Pulmonary embolism" and "Secondary anaemia in infancy and childhood" appealed to the reviewer. Dr. Weiss's review of "The indications and dangers of sedatives and hypnotics" is a significant contribution.

The contents of each volume of *International Clinics* covers a wide field of subject matter and the range of interest is likewise a wide one. *International Clinics* has long been established as a quarterly publication of great merit. Its current success augurs a similarly successful future.

A. H. Sellers

Lobar Pneumonia and Serum Therapy. *By Frederick T. Lord, M.D., Clinical Professor of Medicine, Emeritus, Harvard Medical School, and Roderick Heffron, M.D., Field Director, Pneumonia Study and Service, Massachusetts Department of Public Health. Published by the Commonwealth Fund, 41 East 57th Street, New York, 1936. 91 pages. Price, $1.00.*

This book gives the results of a study of pneumonia carried out in Massachusetts during the past five years and financed by the Commonwealth Fund. The text comprises an outline of the application of specific therapy to lobar pneumonia, the recognition of the types of pneumococcus infection by the Neufeld or rapid method, the details of the administration of serum and dosage, serum reactions and their treatment, and the results of serum treatment.

The results presented are those of a state-wide study and include over nine hundred patients with lobar pneumonia treated by nearly four hundred physicians. The high incidence of the pneumococcus as the etiological agent in lobar pneumonia is illustrated by data on 3,319 cases collected from the literature. In this group 96 per cent were caused by pneumococci. Similarly the percentage distribution of 9,639 cases of lobar pneumonia by the type of pneumococcus shows that type I was the causative agent in 33.4 per cent

and type II in 23.3 per cent. In other words, over 50 per cent of all cases of lobar pneumonia are caused by types I and II pneumococcus.

In the early part of the work, as soon as the clinical diagnosis of lobar pneumonia was made, the initial doses of serum were given. During 1934 the Neufeld method of rapid typing was adopted as a routine procedure and this afforded such a marked saving of time in type determination that, from 1934 on, typing was carried out first and the administration of type I and type II serum limited to patients having type I or type II pneumonia.

In all, 599 cases of type I and 157 cases of type II, or a total of 756 cases of type I and type II lobar pneumonia were treated with serum. The results of serum therapy show a reduction in the death rate in type I cases from the expected 25 per cent (computed from untreated cases in the literature) to 11 per cent, and in type II cases from 41 per cent to 27 per cent of all cases. This is a striking tribute to the value of serum therapy.

This handbook should be in the possession of every practitioner who is called upon to treat acute pneumonia. It is by far the most up-to-date treatise on the subject. The judicious use of serum as outlined in this work will save the lives of many annually.

M. H. Brown

Health and Human Progress. *By Dr. Rene Sand, Lecturer at the University of Brussels and Technical Counsellor to the League of Red Cross Societies. Translated from the author's revised French text by C. F. Marshall, M.D., F.R.C.S. Published by Kegan Paul, Trench, Trubner & Co., Ltd., Broadway House, 68-74 Carter Lane, London, E.C. 4, England, 1935. 278 pages. Price, 10s. 6d. net.*

"Health is purchasable. We can buy human lives. Each country, within certain limits, decides its own mortality." With these words, Dr. Sand issues a challenge to men and to nations to harness the elements of human progress for the betterment in health of the human race. This volume is really an essay on socialized medicine and the author is not only well qualified for such a task but has remarkable ability for presenting hard facts in a most attractive fashion. This is a fortunate combination, and one rather seldom found in scientific writings.

This book is both an inspiration and an appeal to all interested in the problems of human welfare. The origin and development of sociological medicine and certain fundamental considerations in sociology are discussed. In the chapter called "The Balance-sheet of Sickness and Death" the principal problems in mortality are reviewed briefly, and the author states that in proportion as the deaths from cardiovascular-renal causes occur at advanced ages so is the measure of success for hygiene accentuated. Subsequent chapters deal with physical and mental inequality in the social classes and it is concluded that "for physical vigour as for intelligence, as well as for disease and death, inequality is patent between the social classes. These differences are reduced by the progress of hygiene and welfare."

Dr. Sand then turns his pen to a stimulating discussion of the influence of heredity and environment, occupation, and domestic as well as economic, sanitary, and educational factors upon health and human progress. The reader would do well to dwell upon these sections of the book. Here the author treats of some of the underlying problems of the day. The short section on domestic factors tersely presents the essence of the housing problem, a problem "both universal and urgent". The essential points in housing policy are defined and briefly discussed.

Anyone interested in any phase of the many problems in human welfare and progress should certainly read this book. It is ably written, and sound judgment, scientific evidence,

and common sense are its foundation. The English-speaking world is indebted to Dr. Marshall for an excellent translation of a valuable scientific essay.

A. H. Sellers

Bacteria in Relation to the Milk Supply. *By C. H. Chalmers, B.Sc. (Edin.), N.D.A., The University, Leeds. Published by Edward Arnold & Co., London, England,* 1935. *Canadian agents, Longmans, Green & Co., Toronto* 2. 192 *pages. Price* $1.80.

This book is something more than a compendium of methods for the bacteriological examination of milk. In it the author has dealt in a concise but thorough manner with most of the bacteriological problems which may arise in connection with milk.

Part I of the text is devoted to routine examination of milk and water, taints and abnormal conditions of milk, the isolation and identification of organisms, and the control of the dairy plant. In part II general bacteriological technique is discussed and appendices provide information concerning special media, stains, and the microscope.

The book can be recommended to the bacteriologist who is concerned either with routine examination or special problems of milk. It should serve as a useful guide to laboratory methods in milk control and be a convenient source of reference to all those interested in this field.

P. J. Moloney

Sanitary Law and Practice. *A handbook on public health by W. Robertson, M.D. (Glas.), D.P.H., F.R.C.P. (Edin.), formerly Medical Officer of Health, Edinburgh and Leith; Charles Porter, M.D., B.Sc., M.R.C.P. (Edin.), of the Middle Temple, Barrister-at-Law; and James Fenton, M.D., M.R.C.P., D.P.H., Medical Officer of Health, Royal Borough of Kensington. Eighth edition.* 968 *pages, numerous illustrations. Published by The Sanitary Publishing Co., Ltd.,* 8 *Breams Building, London, E.C.* 4, 1935.

"Robertson and Porter" has been a standard reference and text book in Great Britain for the generations of public health administrators and officials since 1904, serving them as a compendium of public health legislation, including the regulations from the Ministry of Health. This, the eighth edition, was made necessary by the Housing Act of 1935 and the opportunity has been taken to revise chapters dealing with actual administrative practice.

There are fifty-one sections and an appendix to this volume. Those parts which are immediately concerned with legislation are designed to give an analysis of the statute or statutes involved, as well as an appreciation of the particular duties (including the accepted technical methods of application) of the official concerned with their enforcement.

Although the constitutional provisions for public health legislation in Canada allow wide variations in provincial practices, sanitary law as such is basically founded upon the experience of Great Britain. It therefore follows that all health officials in Canada who are called upon to submit advice to legislators and to enforce the law should have a reference of this nature at their command. Particularly is this true in Canada where medical men trained in the law are so conspicuously rare that public health legislation must necessarily be drafted by legal gentlemen not trained in public health. We recommend this volume to all Canadian public health administrators.

P. A. T. Sneath

CURRENT HEALTH LITERATURE

These abstracts are intended to direct attention to articles that have appeared in other journals during the past month. Any of the journals referred to may be borrowed for three days or longer if desired. Address requests to the secretary of the Editorial Board.

Diseases caused by Viruses

The diseases of man that are known or strongly suspected of being caused by viruses are measles, German measles, mumps, fever blisters, herpes zoster, varicella, smallpox, vaccinia, rabies, psittacosis, common colds, influenza, encephalitis of the St. Louis and Japanese B types, epidemic encephalitis, lymphocytic choriomeningitis, poliomyelitis, lymphogranuloma inguinale, Australian X disease, louping ill, Rift Valley fever, yellow fever, dengue fever, warts, and molluscum contagiosum. The nature of viruses and the lesions produced by them and the prevention and treatment of virus diseases by means of vaccines and convalescent or immune sera are discussed.

Thomas M. Rivers, Ann. Int. Med., *9*: 1466, 1936.

Value of State Health Districts and County Health Districts

Godfrey states that a whole-time health service is a necessity both in directing and operating effectively local as well as state and national health organizations. The method of state health districts possesses potential advantages which outweigh those of the county health department.

(1) The state is more capable of apportioning an area and population suitable to the requirements of efficient health administration.

(2) This method provides "a career service in which standards of ability and professional qualifications constitute the exclusive basis of preferment" instead of a career which, when governed locally, is ever hazardous, dependent on local politics, prejudice and whims.

(3) A district health set-up can more readily be based on the needs of the district rather than on its ability to pay.

(4) When the local health officer and his personnel are supervised by a larger, more responsible staff, their work is more purposeful and more effective than if they are locally autonomous.

(5) A state district system provides for the entire state and may be readjusted according to the capacity of the officer in charge.

(6) Centralized authority makes for more decisive prompt action in emergencies and for a higher degree of uniformity.

(7) It eliminates local politics.

(8) Highly specialized services provided by the state, such as for orthopedics, tuberculosis, syphilis, maternal and infant hygiene, etc., can be readily integrated and cover all districts instead of only one.

(9) It is more economical than dissociated units and personnel of higher quality are available because of larger opportunities and increased security against dismissal.

Edward S. Godfrey, Am. J. Pub. Health, *26*: 465, 1936.

The Known and Unknown of Bacillus Pertussis Vaccine

Sauer presents further experiments with prophylactic immunization against whooping cough. The vaccine used was prepared from freshly isolated strains of *haemophilus pertussis*. A total dosage of 8 cc. of vaccine (70,000-80,000 million bacilli) is given in 3 successive doses, 2 injections (one in each arm) being given on each occasion. It is important because of the high morbidity and mortality in infants from this disease to vaccinate against whooping cough during the second half-year of life. One thousand three hundred and four non-immune children received the vaccine. Of these 127 were known to have been exposed to cases of whooping cough. Ten of these exposed contracted whooping cough, an incidence of only 8 per cent, which would strongly suggest a high protective value for the vaccine.

L. Sauer, Am. J. Pub. Health, *25*: 1226, 1935.